



To: John Caulo

Date: April 23, 2020

## Memorandum

Project #: 58237.00

From: Jenn Conley, PE  
Karen Sentoff, EIT

Re: Burton Hub  
Traffic Impact Study  
Burlington, VT

---

VHB has conducted a Traffic Impact Study (TIS) for the proposed redevelopment of the Burton Hub properties located at 180 and 266 Queen City Park Road (formerly 80 and 152 Industrial Parkway) in Burlington, Vermont. The site occupies the eastern frontage of Queen City Park Road where it follows a north south alignment. The primary access to the site is from US 7 via Queen City Park Road or Home Avenue.

The site encapsulates the Burton main office and retail property at 180 Queen City Park Road as well as the partially vacant adjacent facility at 266 Queen City Park Road, which currently serves as prototyping, storage, and office space for Burton. The proposed redevelopment program of the site includes the following elements:

- 180 Queen City Park Road will be adapted to serve as 66,300 square feet of office space with 2,750 square feet of storage;
- 266 Queen City Park Road will be renovated to serve multiple purposes, including:
  - o 10,275 square feet of office space;
  - o 8,745 square feet of research and development;
  - o 18,425 square feet of manufacturing;
  - o 12,545 square feet of storage and warehousing;
  - o 7,825 square feet of retail;
  - o 6,835 square feet of restaurant;
  - o 12,265 square feet of performing arts space; and,
  - o 7,465 square feet of indoor recreation space;
- Parking will be reconfigured from the current 276 spaces at 180 Queen City Park Road and 181 spaces at 266 Queen City Park Road to be a combined 496 spaces.

The Traffic Impact Study is summarized within this document, which contains:

- a description of the site and existing transportation network in the study area;
- a summary of the safety and crash data within the study area;
- a description of the proposed redevelopment program for the site;
- a trip generation and distribution estimate for the proposed redevelopment;
- a parking demand evaluation;

40 IDX Drive, Building 100

Suite 200

South Burlington, Vermont 05403

- an evaluation of traffic operations at the intersections identified in Figure 1; and,
- a set of conclusions and recommendations to support the project.

## Existing Conditions

A review of existing conditions focused on the project site and transportation network access to and from the site as depicted in Figure 1. The project site and network in the study area were summarized by the roadway characteristics, current land use and trip generation, permitted land use, and safety assessment.

\vhb\gbl\proj\SBurlington\58237.00 LandPlan Burton TIS\cad\dts\planset\58237.00\_Burton\_TrafficNet.dwg

## STUDY AREA

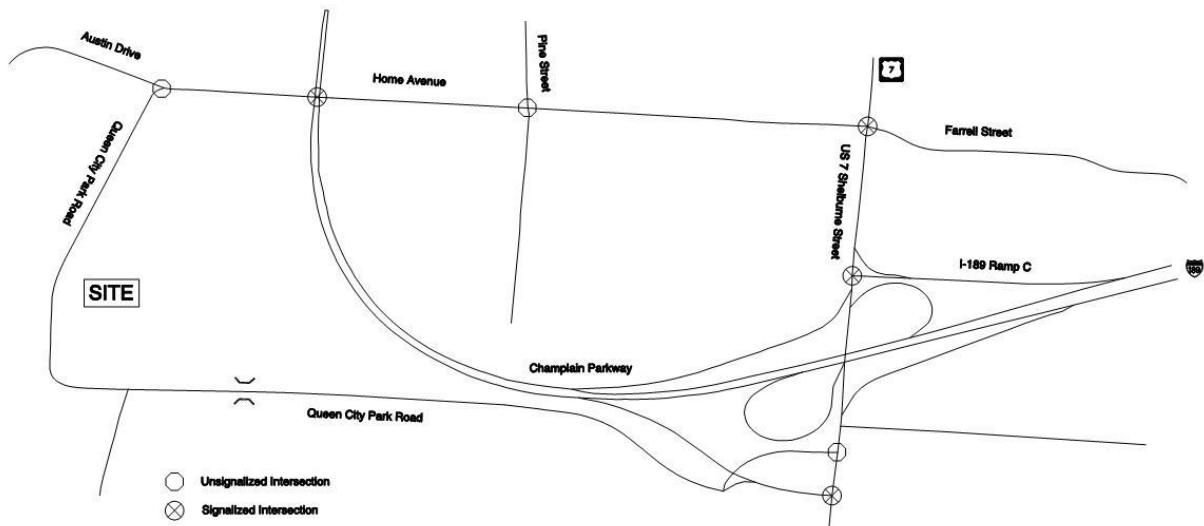


Figure 1  
Study Area  
Burton Redevelopment

## Roadway Characteristics

### Queen City Park Road

Queen City Park Road is a Class 2 Town Highway situated at the southernmost edge of Burlington, Vermont, crossing over to South Burlington before reaching its eastern terminus at US-7 / Shelburne Road. On July 1<sup>st</sup>, 2019, the name of Industrial Parkway, from its southern terminus at Queen City Park Road to its northern terminus at Home Avenue, was changed to Queen City Park Road. With the name change came the renumbering of the locations along the new section of Queen City Park Road, including 180 and 266 Queen City Park Road, where Burton's proposed headquarter expansion is located.

The posted speed limit in Burlington is 25 miles per hour unless otherwise posted. Queen City Park Road at the southern origin is posted as 25 miles per hour and is otherwise assumed to be 25 mph. In the immediate vicinity of the Burton site, Queen City Park Road has 28-feet of pavement width to facilitate two-way traffic. South of the project site, Queen City Park Road crosses a single lane bridge with no traffic control.

There are no formalized bicycle or pedestrian facilities along Queen City Park Road in the immediate vicinity of the project site, with the exception of approximately 130 feet of sidewalk and a bus transit shelter in front of GMT's facility and approximately 400 feet of side path from Central Avenue to a pedestrian bridge adjacent to the single lane bridge south of the project site. These two short facilities are not connected to other active transportation facilities or the broader network like the sidewalks further east along Queen City Park Road, the sidewalks to the north on Home Avenue or Austin Drive, or the bike path that runs along the proposed Champlain Parkway corridor.

Although Queen City Park Road is not under construction, there is construction happening in the vicinity of the project site that is likely affecting traffic patterns in the study area. Pine Street from Home Avenue to Flynn Avenue is under construction and is generally limited to one-way traffic southbound. In addition, the dead end of Queen City Park Road into the former K-Mart parking lot – a very popular bypass to go south on Shelburne Road – is under construction. The parking lot and bypass road are currently closed to traffic. These significant disruptions to the typical traffic patterns, especially for more local traffic, are likely affecting volumes at the intersections within the study area.

### Home Avenue

Home Avenue is similarly a 25-mph facility with a Class 3 Town Highway classification. Home Avenue is an east-west connection between Queen City Park Road and US-7, intersecting Pine Street and, in the future, the proposed Champlain Parkway in between. Currently Home Avenue is affected by construction at the intersection with Pine Street.

### Pine Street

Pine Street is a 25-mph facility and a north-south connection from Queen City Park Road at its southern terminus through to the downtown core of Burlington at Bank Street. Currently Pine Street is under construction from Flynn Avenue to Home Avenue, where significant construction activities limit the traffic to one-way southbound.

### Current Land Use and Trip Generation

At 69,053 total square feet, 180 Queen City Park Road currently houses the Burton office space (60,767 square feet) and the Burton Flagship retail store (8,286 square feet). At 84,380 total square feet, 266 Queen City Park Road houses some manufacturing and prototyping (20,250 square feet), storage and warehousing (16,000 square feet), and general office space (18,000 square feet), with the remaining approximately 30,130 square feet laying vacant.

According to the ITE Trip Generation Manual 10<sup>th</sup> Edition, current uses of the Burton Hub site (encapsulating the occupied square footage at both the 180 and 266 properties) should generate 115 AM peak hour trips and 141 PM peak hour trips. Peak period observations of the six site driveways on Wednesday, July 31, 2019 indicated that the current uses generate slightly more trips than expected based on ITE estimates, with 150 trips in the AM peak hour and 169 in the PM peak hour observed. A comparison of the ITE and observed trip generation for the site is summarized in **Table 1**.

**Table 1. Peak Hour Trip Generation ITE vs. Observed**

		<b>ITE</b>	<b>Observed</b>
AM	Enter	97	137
	Exit	18	13
	Total	<b>115</b>	<b>150</b>
PM	Enter	37	9
	Exit	104	160
	Total	<b>141</b>	<b>169</b>

### Permitted Land Use

With a combined total of 153,433 square feet, 180 and 266 Queen City Park Road are located in an Enterprise – Light Manufacturing zoning district, which primarily serves commercial and industrial uses appropriate for the close proximity to residential use. The zoning allows for uses of manufacturing, warehousing, research and development, office space – technical, photo studio, general merchandise/retail, and restaurant – take-out and conditional uses of performing arts center, recreational facility – indoor, and café. The most intense of these land uses would be office space. Should the existing buildings be redeveloped into office spaces, the total trips visiting the site would be 178 in the AM peak hour and 176 in the PM peak hour, or approximately 25 to 55 percent higher than the ITE estimates for the existing site.

### Safety Assessment

A review of the High Crash Location Report (2012-2016) revealed three segments and one intersection within the study area that are designated high crash locations. These high crash locations are all along the US-7 corridor, where

primary access to the project site on Queen City Park Road is facilitated. These locations include the segment of US 7 from Laurel Hill Drive through the Queen City Park Road intersections, the segment of US 7 from I-189 Ramp C (off-ramp) to north of Scarff Avenue (through the intersection with Home Avenue), the segment of I-189 from the merge of Ramp E through the merge of Ramp A, and the intersection of US 7 with the I-189 Ramp A (on-ramp) and Swift Street.

A desktop review of crash data for the most recent 5 years of data (2014-2018) revealed a total of 454 crashes in the project study area. Data were pulled from the Crash Query Tool and selected for only the segments and intersections of interest to this project. Of the 454, only 51 were attributed Queen City Park Road or Home Avenue. Six of the 51 crashes resulted in injury, with the majority of crashes occurring at intersections and the most common crash type of rear-ends. The remaining 403 crashes were attributed to the US 7 corridor from Lindenwood Drive to north of Home Avenue and the I-189 interchange including the ramp merges. Of these crashes on the major roadways that provide access to the project site, there was one fatality and 36 injury crashes. Again, the most common crash type was rear-ending with the majority of crashes occurring at intersections or on-/off-ramps.

## Future Conditions

The future conditions for the project site and study area focused on anticipated Champlain Parkway traffic patterns, proposed Burton Hub development, other considerations for development on Queen City Park Road, and the future condition traffic networks for evaluating the Burton Hub project development.

### Champlain Parkway Traffic

The Champlain Parkway is a proposed transportation link that will connect from I-189 and US Route 7 and the City Center District passing through, and providing better access to, the Burton project area. The final alignment is anticipated to continue along the I-189 alignment at US Route 7 providing a full access interchange at US Route 7. The Champlain Parkway will change in character at this point to a single lane in each direction widening out at intersection points. The first intersection will occur at Home Avenue just north of where Home currently intersects with Batchelder Street which is currently a local roadway between Queen City Park Road and Pine Street. With the Champlain Parkway in place, Batchelder Street will become a dead-end roadway accessed via Morse Place and the Champlain Parkway will intersect with Home Avenue at a four-way signalized intersection providing more direct access from I-189 and I-89 beyond into this area that includes the Burton property.

The Champlain Parkway underwent significant review, traffic analysis, roadway design and is anticipated to be constructed in upcoming years. The traffic analysis for the Champlain Parkway includes the following intersections that the City of Burlington has identified as intersections for study as a part of the Burton project:

- US Route 7 at Home and Farrell
- US Route 7 at I-189 westbound ramps
- US Route 7 at I-189 eastbound ramps
- US Route 7 at Queen City Park Road
- Home Avenue at Pine Street
- Home Avenue at Queen City Park Road and Austin Drive

The Champlain Parkway traffic analysis evaluated 2008 traffic volume operations both without and with the Champlain Parkway in place. In addition, the traffic analysis evaluated 2028 traffic volume operations both without and with the Champlain Parkway.

VHB has reviewed historic VTrans traffic volume data at area intersections and found that traffic volumes have not reached the levels anticipated as a part of the 2008 projections included in the Champlain Parkway traffic analysis. VTrans traffic volume data along Home Avenue that was collected in 2014 and 2018 was found to be approximately 10 to 25 percent lower than the 2008 conditions without the Champlain Parkway in that study. Because existing traffic volume data is impacted by the existing construction projects near the Burton site, City of Burlington officials have requested that the Burton project use the 2008 conditions from the Champlain Parkway as the equivalent of an existing network for the Burton project.

The Champlain Parkway traffic analysis also evaluated 2028 conditions without and with the Champlain Parkway in place. The City of Burlington has requested that the project evaluate the impact of the Burton project on the future year 2028 traffic volume conditions as evaluated in the Champlain Parkway traffic analysis – both without and with the Champlain Parkway infrastructure in place. The 2008 and 2028 traffic volume networks without and with the Champlain Parkway in place are provided in the Appendix.

### **Proposed Development**

As outlined above, 180 Queen City Park Road will be adapted to serve as 66,300 square feet of office space with 2,750 square feet of storage. 266 Queen City Park Road will be renovated to serve multiple purposes, including: 10,275 square feet of office space; 8,745 square feet of research and development; 18,425 square feet of manufacturing; 12,545 square feet of storage and warehousing; 7,825 square feet of retail; 6,835 square feet of restaurant; 12,265 square feet of performing arts space; and, 7,465 square feet of indoor recreation space.

### *Trip Generation*

Trip estimates for the proposed redevelopment were calculated based on rates published by the Institute of Transportation Engineers (ITE) in the 10<sup>th</sup> edition of the Trip Generation Manual for the weekday AM and PM peak hours. These time periods are typically the highest volume times on the adjacent roadway network and are used for this analysis.

The following ITE land use codes (LUCs) were used to estimate peak hour trips of the proposed development:

- LUC 710 – General Office Building
- LUC 760 – Research and Development
- LUC 140 – Manufacturing
- LUC 876 – Retail
- LUC 150 – Warehousing
- LUC 930 – Fast Casual Restaurant
- LUC 435 – Multipurpose Recreational Facility

In addition, because there is not an applicable ITE LUC for the Performing Arts Center, VHB obtained information from the Higher Ground who will be occupying the site. Based on information from Higher Ground's website, the facility

hosts an average of four to five events per week with typical showtimes of 7:30 or 8:30 PM with door opening an hour earlier. The existing Higher Ground parking lot accommodates 350 vehicles which accommodates even sold out nights (1050 attendees). Applying the one vehicle trip per three attendees' rate to the proposed site occupancy of 1500 people results in a peak vehicular demand of 500 trips per show. Although shows start significantly after the peak hour, a conservatively high estimate of approximately 30 percent of those trips may occur during the commuter peak hour.

Because the restaurant space is expected to serve employees of Burton as well as concert goers (and the public), it was conservatively estimated that 50 percent of the trips to the restaurant space will be internally captured from use by Burton employees and concertgoers on a Higher Ground full occupancy night.

The total trip generation of the site is anticipated to be 121 AM peak hour trips (101 in and 20 out) and 363 PM peak hour trips (211 in and 153 out). As indicated above, the current site is generating 115 AM peak hour trips (97 in and 18 out) and 141 PM peak hour trips (37 in and 104 out). Therefore, the net trip generation anticipated at the site will be 6 trips during the weekday AM peak hour (4 in and 2 out) and 222 trips during the PM peak hour (174 in and 48 out). The trip generation data is provided in **Table 2** below.

**Table 2. Trip Generation**

		Burton	Net
	Existing	Hub	Trips
AM	Enter	97	101
	Exit	18	20
	Total	115	121
PM	Enter	37	211
	Exit	104	153
	Total	141	363

#### *Trip Distribution*

The trips generated by the proposed redevelopment were assigned to area roadways based on likely trip patterns associated with those trips, as depicted in Figure 2 and Figure 3. For employees and visitors to Burton, the trips were assigned following existing traffic patterns to and from the site. The trip distribution for Higher Ground patrons was developed using credit card data for the past year. Based on that data, approximately 30 percent of Higher Ground patrons will approach locally from the north, approximately 20 percent will approach locally from the south, and 50 percent will approach more regionally via I-189. Therefore, the Higher Ground trips were assigned separately to reflect different travel patterns.

For the condition with the Champlain Parkway in place, the trip distribution considered how the presence of that roadway would influence travelers when making route choices. Some trips may use the Champlain Parkway to avoid congestion on US Route 7 when accessing the site, however, a significant amount of trips will continue to access the site via the existing routing as most Burlington related trips will not see reduced travel times associated with the addition of Champlain Parkway to the infrastructure. A review of the Champlain Parkway traffic volume networks indicates that peak hour trips to and from Burton and surrounding businesses were not expected to divert from current travel routes. However, the Champlain Parkway did not anticipate the redevelopment to include a more regional generator such as Higher Ground. The Higher Ground trips that are expected to originate more regionally were diverted to Champlain Parkway for the condition with that infrastructure in place.

\vhb\gb\proj\SBurlington\58237.00 LandPlan Burton TIS\cad\dts\planset\58237.00\_Burton\_TrafficNet.dwg

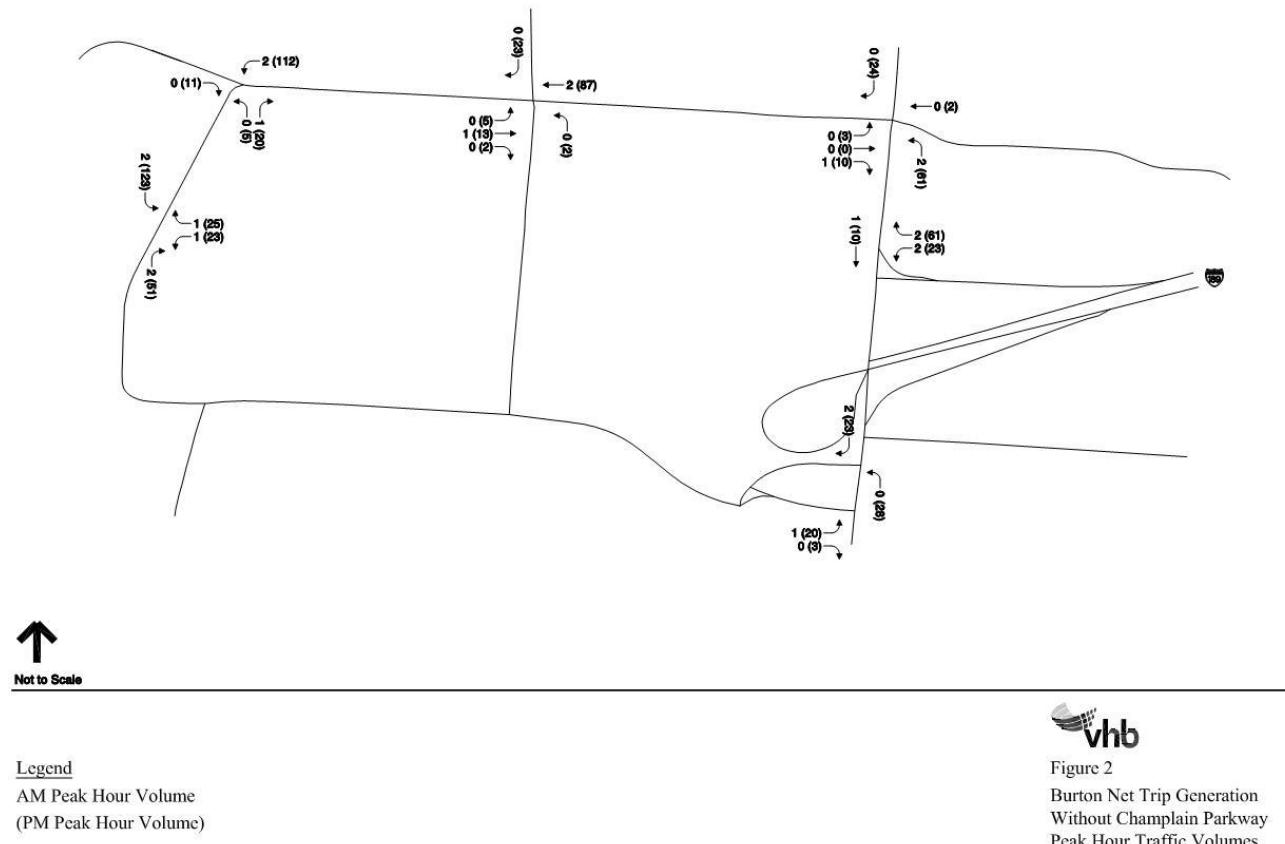
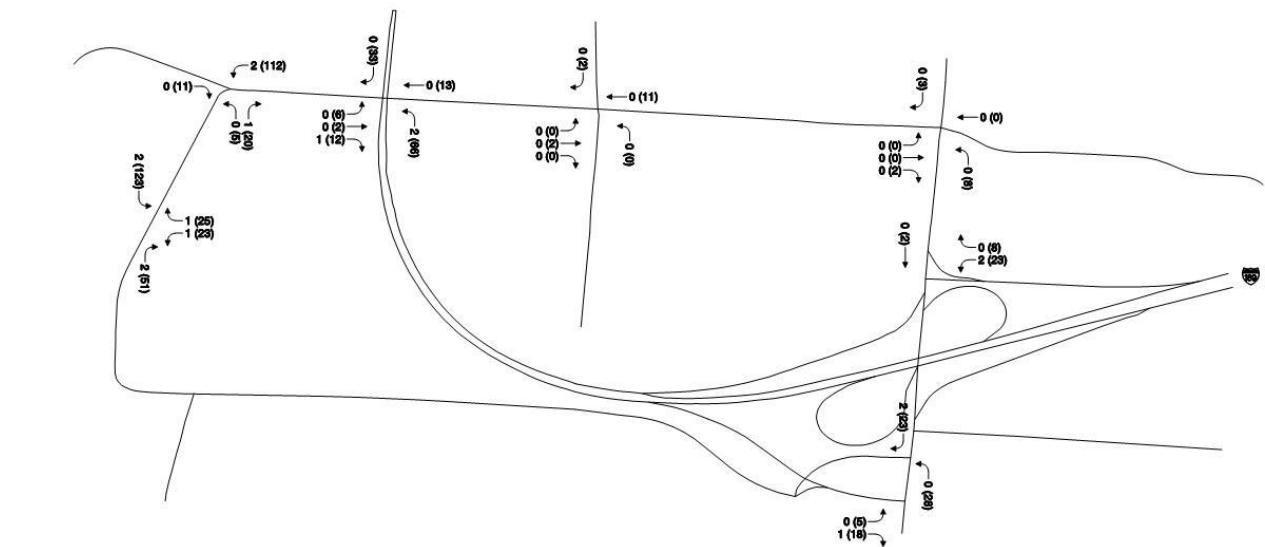


Figure 2  
Burton Net Trip Generation  
Without Champlain Parkway  
Peak Hour Traffic Volumes

\v\hb\gb\proj\SBurlington\58237.00\_LandPlan Burton TIS\docs\memos\Burton\_Hub Traffic Impact Study 20200423.docx



Not to Scale

Legend

AM Peak Hour Volume  
(PM Peak Hour Volume)



Figure 3  
Burton Net Trip Generation  
With Champlain Parkway  
Peak Hour Traffic Volumes

### Potential Reuse Development

The calculation of trip generation for the proposed site redevelopment included information associated with the Higher Ground tenant. The City of Burlington has requested an analysis of the other uses that could occupy the Higher Ground square footage in the event that the Higher Ground does not remain at this site. Based on allowable land uses in this zoning district, the highest generating use of the Higher Ground site (without a special permit), would be office. VHB conducted an analysis of the spaces associated with the Higher Ground portion of the redevelopment instead being office space and found that as office space the site would generate 21 additional trips during the AM peak hour and 134 fewer trips during the PM peak hour.

### *Parking Evaluation*

A review of the potential parking requirements for the Burton Hub redevelopment was conducted according to the Burlington Comprehensive Development Ordinance Article 8 and the ITE Parking Generation Manual, 5<sup>th</sup> Edition. Burlington parking requirements for the Shared Use District, within which the Burton site exists, dictate that a total of 239 spaces are required for the multiple uses of the proposed Burton Hub without Higher Ground included in the calculation. More conservatively, the ITE Parking Generation Manual specifies that 313 spaces would accommodate the multiple uses of the Burton site, without considering Higher Ground.

It is anticipated that the primary use of the Burton parking spaces will shift from the multiple uses during the day (i.e. office, research and development, manufacturing, retail, warehouse, recreation, restaurant) to Higher Ground use during the evening. According to Burlington's ordinance, Higher Ground adds a requirement of 375 spaces based on an estimated maximum occupancy of 1500 patrons. ITE does not have a parking generation rate for performing arts space or an equivalent, so the Burlington parking requirements were assumed to apply. The 496 parking spaces in the proposed conceptual plans for the site would more than accommodate the 313 spaces needed during the day and the 375 spaces necessary to accommodate a show or event at Higher Ground in the evening.

### **Other Queen City Park Road Development**

101 Queen City Park Road is home to the Green Mountain Transit (GMT) main offices and bus service garage, which serves as the non-revenue start and end to all bus routes. The buses are currently routed via Queen City Park Road to access the facility, avoiding the residential areas along Home Avenue. With the Champlain Parkway, this may change to route buses through the Queen City Park Road and Home Avenue intersection and onto Champlain Parkway at Home Avenue. The modification of the bus routing is not expected to impact the traffic volumes during the AM and PM peak hours as the busses are in service during those times.

Like the GMT office and garage, Rhino Foods and Edlund Company are also accessed from the western side of Queen City Park Road at address 179 and 319, respectively. As outlined above, the Champlain Parkway traffic volume networks did not redistribute trips from Queen City Park Road once the new roadway connection was in place. However, even prior to consideration of the Champlain Parkway infrastructure, the traffic volumes analyzed as a part of that study accounted for likely land use changes in the area.

### **Traffic Networks**

Based on the traffic volume comparisons above, and discussions with Burlington Public Works staff, for the Burton project, the 2008 conditions without and with the Champlain Parkway will serve as Existing/Opening Year Traffic Volumes without and with the Champlain Parkway. The trips associated with the redevelopment were added to those volumes to result in Existing/Opening Year Traffic Volumes without and with the Champlain Parkway.

2028 conditions without and with the Champlain Parkway are being used as the Burton project 2028 No Build traffic volumes without and with the Champlain Parkway. The trips associated with the Burton redevelopment were added to the 2028 No Build traffic volumes without and with the Champlain Parkway to develop the 2028 Build traffic volumes without and with the Champlain Parkway.

## Traffic Analyses

Intersection capacity analyses were performed for the study area intersections. Levels of Service (LOS) were calculated based on the criteria published in the *2000 Highway Capacity Manual*.<sup>1</sup> Level of Service is the term that defines the conditions that may occur on a given roadway or at an intersection when accommodating various traffic volume loads. Levels of service range from A to F with LOS A representing generally free flowing operating conditions and LOS F representing generally congested conditions. Copies of the LOS calculations are provided in the Appendix.

### Signalized Intersections

**Table 3** summarizes the operational analysis at the *signalized* study area intersections during the Existing and 2028 AM and PM peak hours under No Build and Build conditions. As shown in the table, signalized intersections along US Route 7 currently operate at LOS C or better in the peak hour, with the exception of the I-189 Ramp C intersection which operates at LOS E in the PM peak hour. The analysis is consistent with observations of the corridor. Without construction of the Champlain Parkway, the addition of traffic associated with the Burton redevelopment will result in changes in delay of less than 4 seconds per vehicle during the weekday PM peak hour and drop to LOS F for a single intersection, US Route 7 and I-189 Ramp C.

The Champlain Parkway is anticipated to alleviate some of the existing delays along US Route 7 (Shelburne Street) as traffic diverts from the US Route 7 corridor to the Champlain Parkway. For instance, construction of the Champlain Parkway is anticipated to reduce the current LOS E to LOS C at the US Route 7 and I-189 Ramp C intersection in the PM peak hour, and with the Burton redevelopment would alleviate the anticipated LOS F to LOS C in the current year and LOS D in the future year. The newly signalized intersection of Home Avenue at the Champlain Parkway is anticipated to operate at LOS C in the AM peak hour and LOS E in the PM peak hour. With the Champlain Parkway constructed, the addition of the traffic associated with the Burton redevelopment will result in changes in delay of less than 19 seconds per vehicle during the weekday PM peak hour.

---

<sup>1</sup> Highway Capacity Manual, Federal Highway Administration, Transportation Research Board, 2000.

**Table 3: Signalized Intersection Capacity Analysis Summary**

Intersection Movement	Champlain Parkway No Build						Champlain Parkway Build					
	Burton No Build			Burton Build			Burton No Build			Burton Build		
	v/c <sup>+</sup>	Delay*	LOS **	v/c <sup>+</sup>	Delay*	LOS **	v/c <sup>+</sup>	Delay*	LOS **	v/c <sup>+</sup>	Delay*	LOS **
2008												
<b>US 7 / Home Ave</b>												
AM Peak Hour	0.62	14.5	B	0.62	14.5	B	0.47	11.9	B	0.47	11.9	B
PM Peak Hour	0.73	19.7	B	0.83	22.0	C	0.59	14.0	B	0.59	14.0	B
<b>US 7 / Queen City Park (north)</b>												
AM Peak Hour	0.59	7.0	A	0.59	7.1	A	0.65	14.2	B	0.65	14.2	B
PM Peak Hour	0.88	20.0	C	0.90	23.0	C	0.87	20.6	C	0.88	22.1	C
<b>Champlain Parkway / Home Ave</b>												
AM Peak Hour							0.68	25.3	C	0.68	25.4	C
PM Peak Hour							0.89	38.8	D	0.98	57.5	E
<b>I-189 Ramp C / US 7</b>												
AM Peak Hour	0.83	28.6	C	0.84	28.6	C	0.75	25.6	C	0.75	25.6	C
PM Peak Hour	1.03	76.2	E	1.04	80.1	F	0.89	30.8	C	0.88	31.0	C
2028												
<b>US 7 / Home Ave</b>												
AM Peak Hour	0.72	16.5	B	0.72	16.5	B	0.47	12.4	B	0.47	12.4	B
PM Peak Hour	0.80	21.6	C	0.92	25.9	C	0.59	14.1	B	0.59	14.2	B
<b>US 7 / Queen City Park (north)</b>												
AM Peak Hour	0.62	7.5	A	0.62	7.5	A	0.69	15.0	B	0.69	15.0	B
PM Peak Hour	1.03	30.8	C	1.04	34.1	C	1.01	28.2	C	1.01	29.8	C
<b>Champlain Parkway / Home Ave</b>												
AM Peak Hour							0.74	28.9	C	0.74	29.0	C
PM Peak Hour							0.92	45.4	D	1.01	64.4	E
<b>I-189 Ramp C / US 7</b>												
AM Peak Hour	0.84	29.2	C	0.84	29.3	C	0.77	25.8	C	0.77	25.8	C
PM Peak Hour	1.10	99.2	F	1.11	101.4	F	0.94	35.8	D	0.94	36.9	D

\* Volume to capacity ratio

\* Delay expressed in seconds per vehicle

\*\* Level of Service

### Unsignalized Intersections

**Table 4** summarizes the operational analysis at the *unsignalized* study area intersections during the Existing and 2028 AM and PM peak hours under No Build and Build conditions. As shown in the table, all intersection approaches are expected to operate at LOS C or better, except at the intersection of Pine Street and Home Avenue without the

Champlain Parkway. Construction of the Champlain Parkway would alleviate any current or potential issues at Pine Street and Home Avenue, providing LOS A for all approaches regardless of Burton redevelopment. Once the Champlain Parkway is in place, traffic volumes at unsignalized locations would change, resulting in delay decreases as much as 350 seconds at the southbound Pine Street approach to the intersection with Home Avenue. For all intersection approaches, changes related to the trips generated from the proposed Burton redevelopment result in delay increases of less than 4 seconds once the Champlain Parkway is constructed.

Ref: 58237

April 23, 2020

Page 14

**Table 4: Unsignalized Intersection Capacity Summary**

Intersection Movement		Champlain Parkway No Build						Champlain Parkway Build					
		Burton No Build			Burton Build			Burton No Build			Burton Build		
		2008											
		v/c <sup>+</sup>	Delay*	LOS **	v/c <sup>+</sup>	Delay*	LOS **	v/c <sup>+</sup>	Delay*	LOS **	v/c <sup>+</sup>	Delay*	LOS **
<b>AM</b>	<b>Queen City Park / Home Ave / Austin Dr</b>												
	WB from Home Ave	0.09	5.2	A	0.09	5.2	A	0.09	5.2	A	0.09	5.2	A
	NB from Queen City Park Rd	0.08	10.6	B	0.08	10.6	B	0.08	10.6	B	0.08	10.6	B
	<b>Pine St / Home Ave</b>												
	EB from Home Ave	0.59	22.5	C	0.58	21.8	C	0.18	8.7	A	0.18	8.7	A
	WB from Home Ave	0.93	52.7	F	0.92	50.0	E	0.15	7.9	A	0.15	7.9	A
	NB from Pine St	0.49	19.3	C	0.48	18.8	C	0.10	8.2	A	0.10	8.2	A
	SB from Pine St	1.01	70.3	F	1.01	71.2	F	0.20	8.9	A	0.20	8.9	A
	<b>US 7 / Queen City Park (north)</b>												
	NB left onto Queen City Park Rd	0.08	15.8	C	0.08	15.9	C	0.08	15.8	C	0.08	15.9	C
<b>PM</b>	<b>Queen City Park / Home Ave / Austin Dr</b>												
	WB from Home Ave	0.03	1.7	A	0.11	4.4	A	0.03	1.7	A	0.11	4.5	A
	NB from Queen City Park Rd	0.14	10.5	B	0.21	12.2	B	0.14	10.5	B	0.21	12.2	B
	<b>Pine St / Home Ave</b>												
	EB from Home Ave	0.62	22.8	C	0.73	30.7	D	0.11	8.3	A	0.11	8.3	A
	WB from Home Ave	0.76	29.7	D	1.00	69.7	F	0.25	8.8	A	0.27	9.0	A
	NB from Pine St	0.51	18.8	C	0.57	22.8	C	0.06	7.9	A	0.06	8.0	A
	SB from Pine St	1.47	241.8	F	1.69	341.9	F	0.24	9.3	A	0.25	9.4	A
	<b>US 7 / Queen City Park (north)</b>												
	NB left onto Queen City Park Rd	0.02	16.4	C	0.12	18.2	C	0.02	16.4	C	0.12	18.2	C
Intersection Movement		Champlain Parkway No Build						Champlain Parkway Build					
		Burton No Build			Burton Build			Burton No Build			Burton Build		
		v/c <sup>+</sup>	Delay*	LOS **	v/c <sup>+</sup>	Delay*	LOS **	v/c <sup>+</sup>	Delay*	LOS **	v/c <sup>+</sup>	Delay*	LOS **
		2028											
<b>AM</b>	<b>Queen City Park / Home Ave / Austin Dr</b>												
	WB left from Home Ave	0.11	5.4	A	0.12	5.4	A	0.11	5.4	A	0.12	5.4	A
	NB from Queen City Park Rd	0.09	11.0	B	0.09	11.0	B	0.09	11.0	B	0.09	11.0	B
	<b>Pine St / Home Ave</b>												
	EB from Home Ave	0.69	28.0	D	0.69	28.1	D	0.20	8.9	A	0.20	8.9	A
	WB from Home Ave	1.06	84.6	F	1.06	86.2	F	0.16	8.1	A	0.16	8.1	A
	NB from Pine St	0.55	22.0	C	0.55	22.1	C	0.10	8.2	A	0.10	8.2	A
	SB from Pine St	1.20	135.5	F	1.20	135.9	F	0.22	9.2	A	0.22	9.2	A
	<b>US 7 / Queen City Park (north)</b>												
	NB left onto Queen City Park Rd	0.09	17.2	C	0.09	17.2	C	0.09	17.2	C	0.09	17.2	C
<b>PM</b>	<b>Queen City Park / Home Ave / Austin Dr</b>												
	WB left from Home Ave	0.03	1.7	A	0.12	4.3	A	0.03	1.7	A	0.12	4.3	A
	NB from Queen City Park Rd	0.16	10.9	B	0.24	12.9	B	0.16	10.9	B	0.24	12.9	B
	<b>Pine St / Home Ave</b>												
	EB from Home Ave	0.76	33.5	D	0.84	43.0	E	0.12	8.4	A	0.12	8.4	A
	WB from Home Ave	0.91	50.8	F	1.16	120.3	F	0.27	9.0	A	0.29	9.2	A
	NB from Pine St	0.59	23.5	C	0.62	26.0	D	0.06	8.0	A	0.06	8.1	A
	SB from Pine St	1.74	361.2	F	1.85	410.2	F	0.26	9.6	A	0.27	9.6	A
	<b>US 7 / Queen City Park (north)</b>												
	NB left onto Queen City Park Rd	0.02	22.6	C	0.18	26.6	D	0.02	22.6	C	0.18	26.6	D

\* Volume to capacity ratio

\* Delay expressed in seconds per vehicle

\*\* Level of Service

### Other Analysis – One Lane Bridge

The one lane bridge on Queen City Park Road currently operates as a yield control unsignalized intersection with vehicles yielding in the event there is a vehicle operating in the opposing direction on the bridge. Anecdotally, when project team members have traveled over the one lane bridge, they have typically not encountered another vehicle and have experienced little delay as they have only hesitated to verify no one is coming from the other direction before proceeding.

The City of Burlington has expressed a concern regarding the operation of the bridge in the future. Based on the traffic volumes presented in the Champlain Parkway traffic analysis, traffic volumes along Queen City Park Road are anticipated to change very little with the addition of the new roadway infrastructure to the network, so it is likely that the bridge will continue to operate in a similar fashion in the future.

The Burton redevelopment will increase traffic volumes during the PM peak hour, however, based on the origins of the traffic and the routes provided by mapping software and smartphone apps to reach the site, the PM peak hour traffic entering the Higher Ground portion of the site is more likely to use Home Avenue to reach the site. During the late evening hours, when Higher Ground traffic will be exiting and mapping software and smartphone apps are more likely to route traffic toward the one lane bridge, the typical traffic volumes on the bridge will be significantly lower than during the peak hour with little to no opposing traffic, and therefore able to accommodate the exiting eastbound traffic.

As directed by the City's peer review consultant, VHB has simulated the one lane bridge operation using SimTraffic. The bridge was simulated as series of closely spaced, signalized, split phase intersections representative of the alternating, two-way operation in the real-world. Consistent with operations in the field, where most vehicles hesitate before proceeding, the simulation shows most vehicles have little delay before proceeding and travel across the bridge one at a time in alternating directions. The delay for the existing operation of the one lane bridge was estimated to be less than 8 seconds. Additional simulations of Burton build and late evening Higher Ground show release scenarios operated with similar delays. The addition of project related traffic resulted in no more than one additional second of delay for the build conditions. At times in the simulation, as in the field, traffic on the same approach will travel one after the other when no other vehicles are waiting. The outputs from the simulation are included in the Appendix.

### Other Analysis - Parking Requirements

A review of the potential parking requirements for the Burton Hub redevelopment was conducted according to the Burlington Comprehensive Development Ordinance Article 8 and the ITE Parking Generation Manual, 5<sup>th</sup> Edition. Burlington parking requirements for the Shared Use District, within which the Burton site exists, dictate that a total of 239 spaces are required for the multiple uses of the proposed Burton Hub without Higher Ground included in the calculation. More conservatively, the ITE Parking Generation Manual specifies that 313 spaces would accommodate the multiple uses of the Burton site, without considering Higher Ground.

It is anticipated that the primary use of the Burton parking spaces will shift from the multiple uses during the day (i.e. office, research and development, manufacturing, retail, warehouse, recreation, restaurant) to Higher Ground use during the evening. According to Burlington's ordinance, Higher Ground adds a requirement of 375 spaces for an occupancy of 1500 patrons. ITE does not have a parking generation rate for performing arts space or an equivalent,

so the Burlington parking requirements were assumed to apply. The 496 parking spaces in the proposed conceptual plans for the site would more than accommodate the 313 spaces needed during the day and the 375 spaces necessary to accommodate a show or event at Higher Ground in the evening.

## Conclusions

The redevelopment of the Burton site will accommodate a new mix of land uses including a performing arts space. As outlined above, conservatively high trip generation estimates are anticipated to increase site trips by 6 trips during the AM peak hour and 222 trips during the PM peak hour. As shown, the delay increases associated with the project at the study area intersections are anticipated to be minor, except at the intersection of Pine Street and Home Avenue when the Champlain Parkway is not constructed.



# Technical Appendix

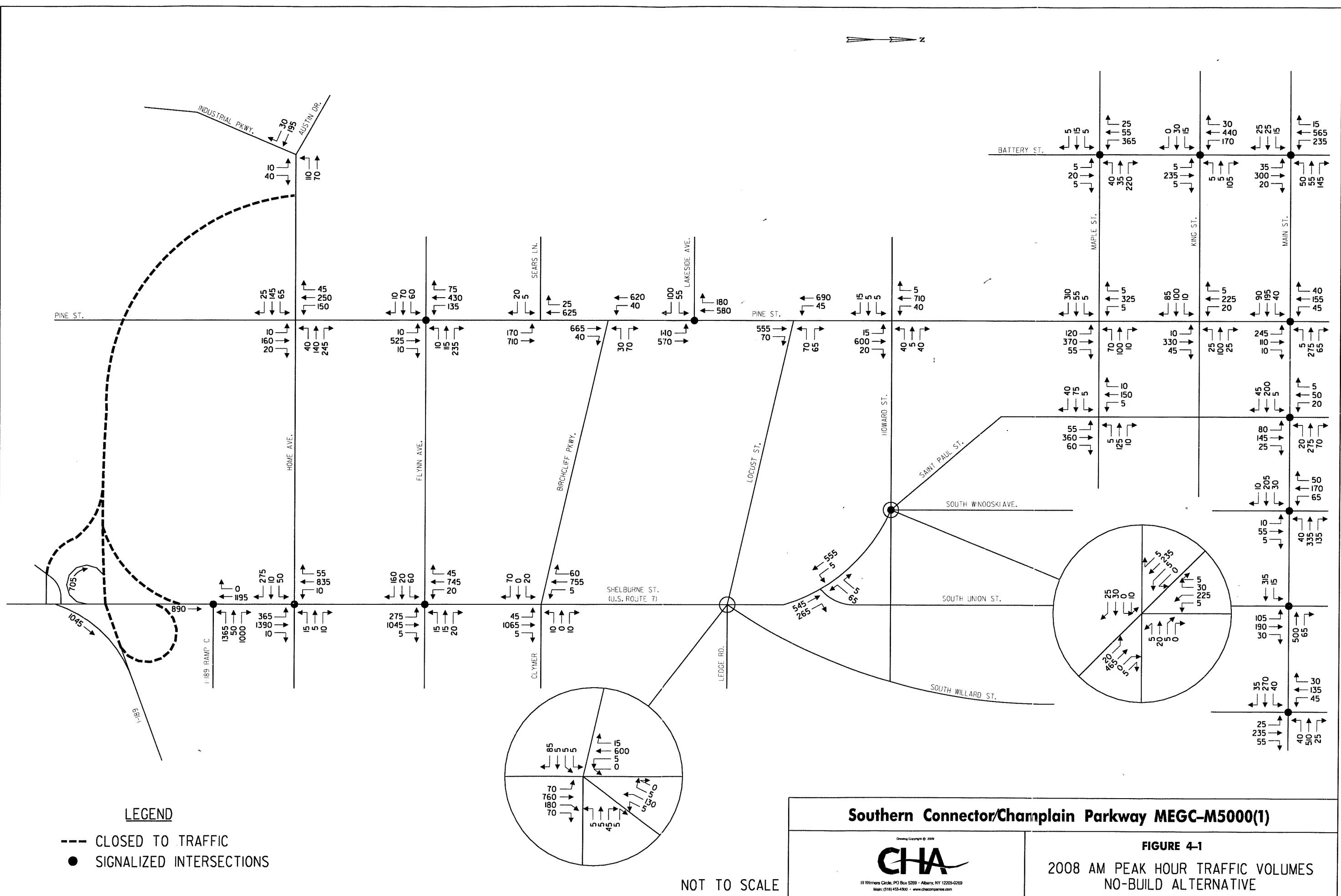
## Traffic

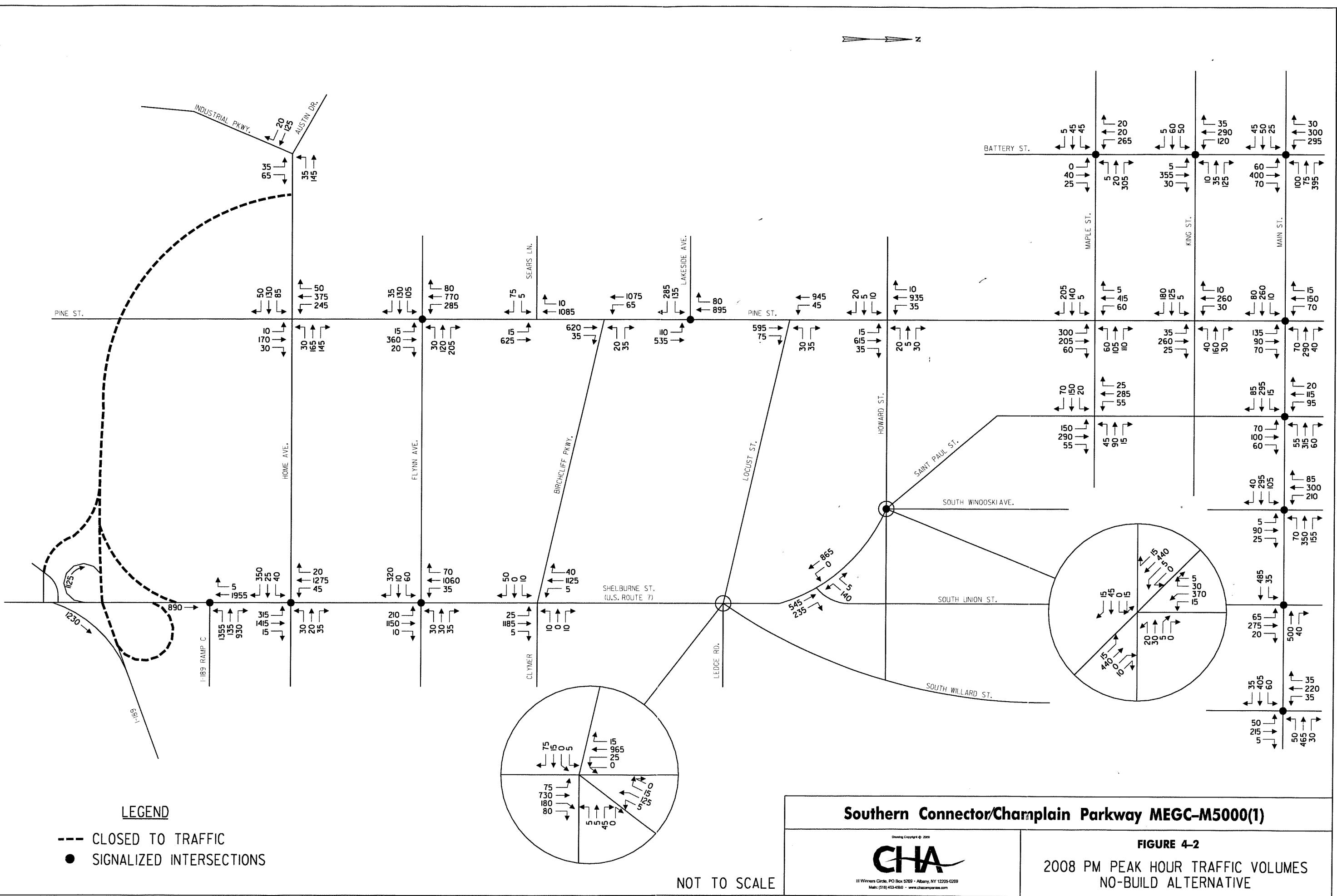
- 
- Traffic Data & Trip Generation
    - Champlain Parkway Study Volumes
    - Burton Hub Redevelopment Build Volumes
    - Trip Generation
  - Intersection Capacity Analyses
    - Signalized Intersections Burton Hub No Build
    - Unsignalized Intersections Burton Hub No Build
    - Signalized Intersections Burton Hub Build
    - Unsignalized Intersections Burton Hub Build
  - Safety Assessment Data
    - High Crash Locations
    - Crash Review Data
  - Single Lane Bridge
    - Simulation Queueing Report

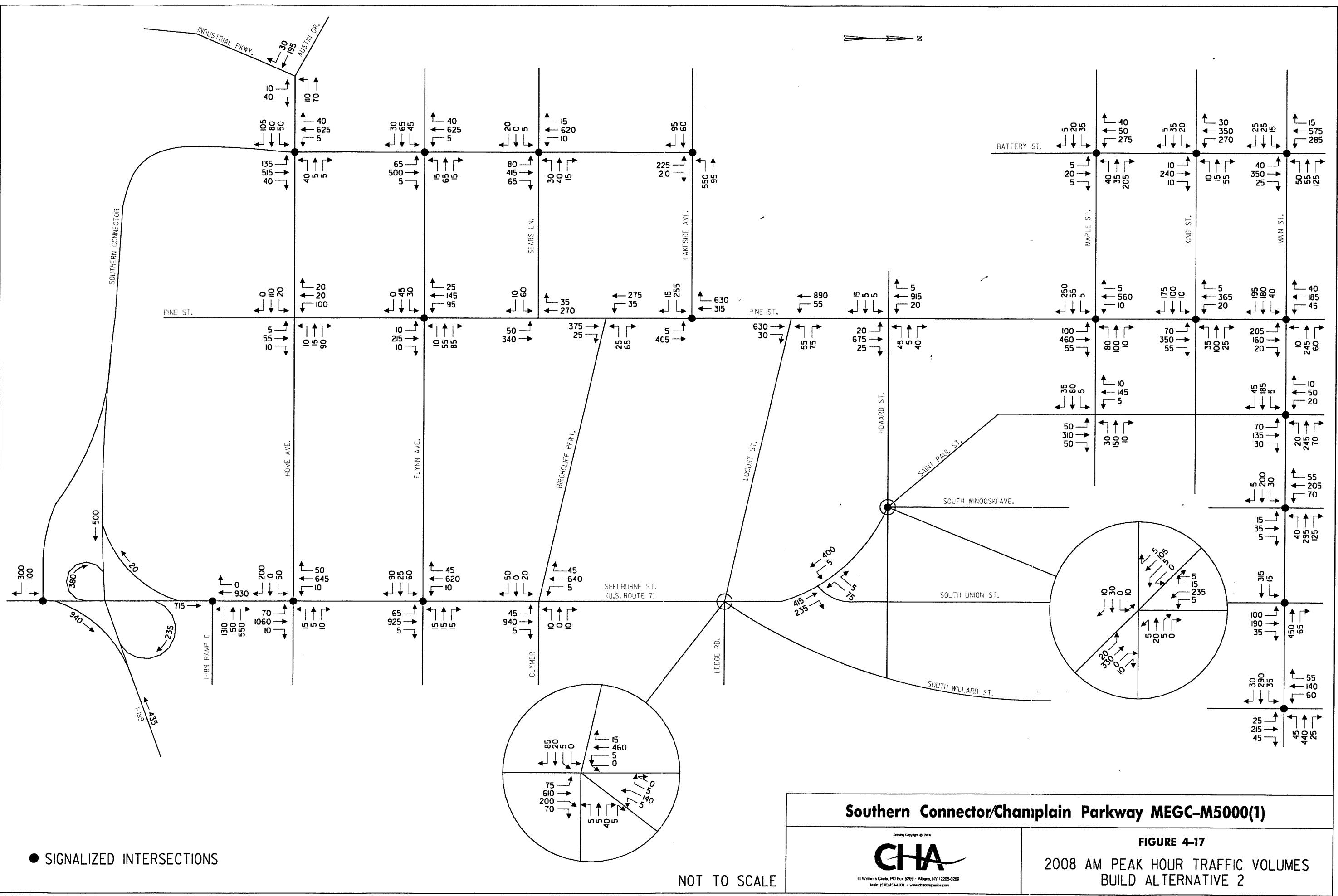


---

## Traffic Data & Trip Generation







## ● SIGNALIZED INTERSECTIONS

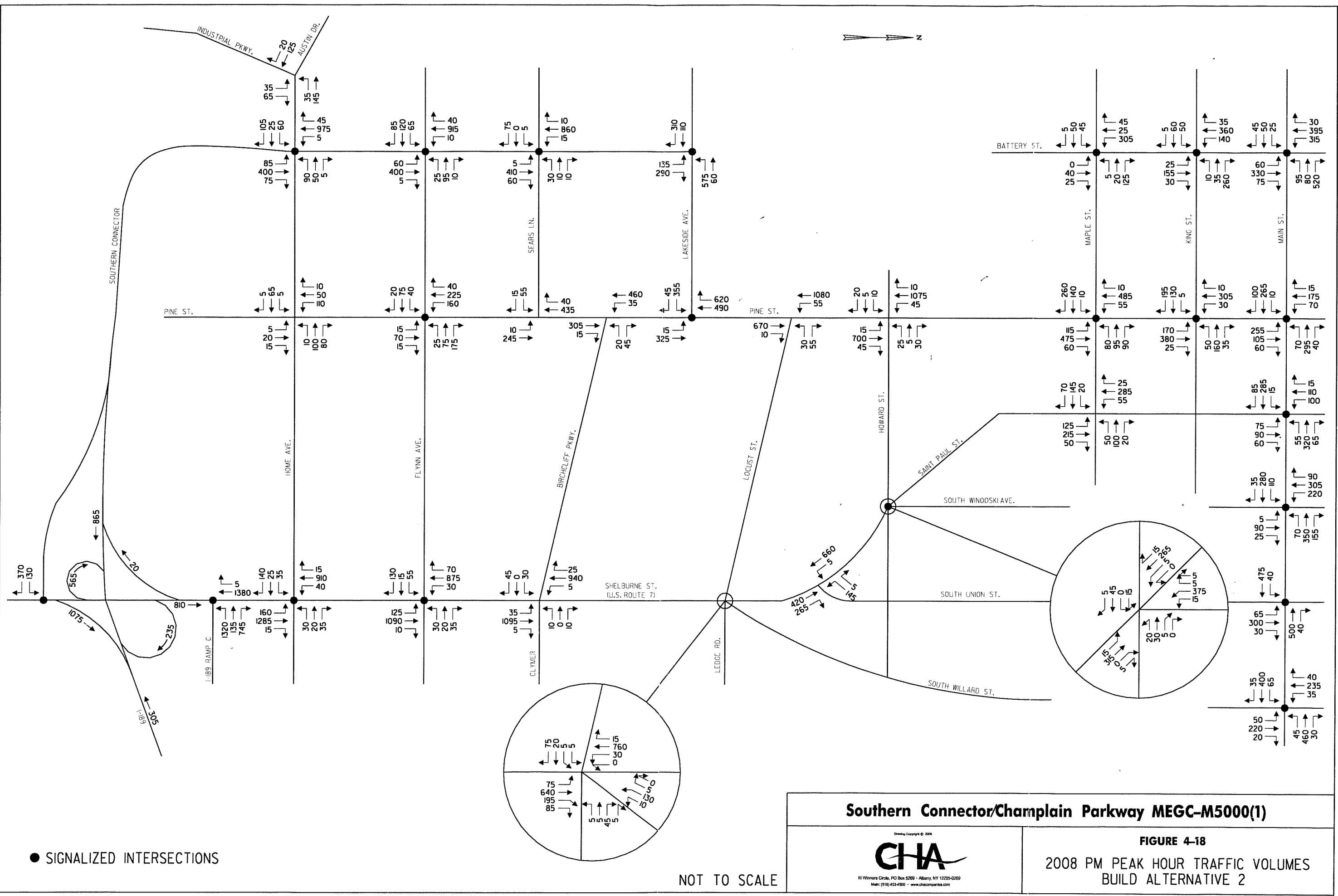
NOT TO SCALE

## **Southern Connector/Champlain Parkway MEGC-M5000(1)**



**FIGURE 4-17**

## 2008 AM PEAK HOUR TRAFFIC VOLUMES BUILD ALTERNATIVE 2



## ● SIGNALIZED INTERSECTIONS

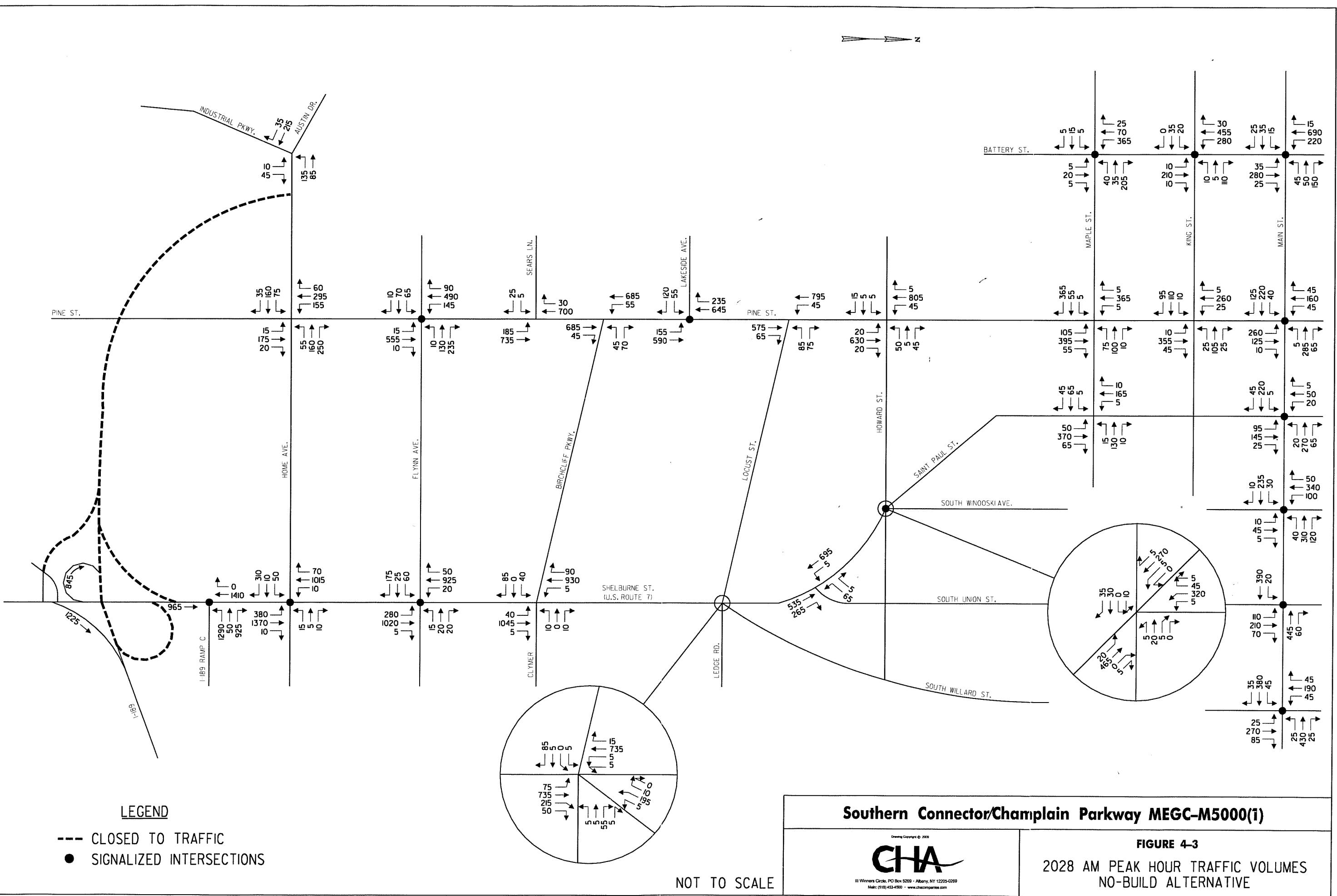
NOT TO SCALE

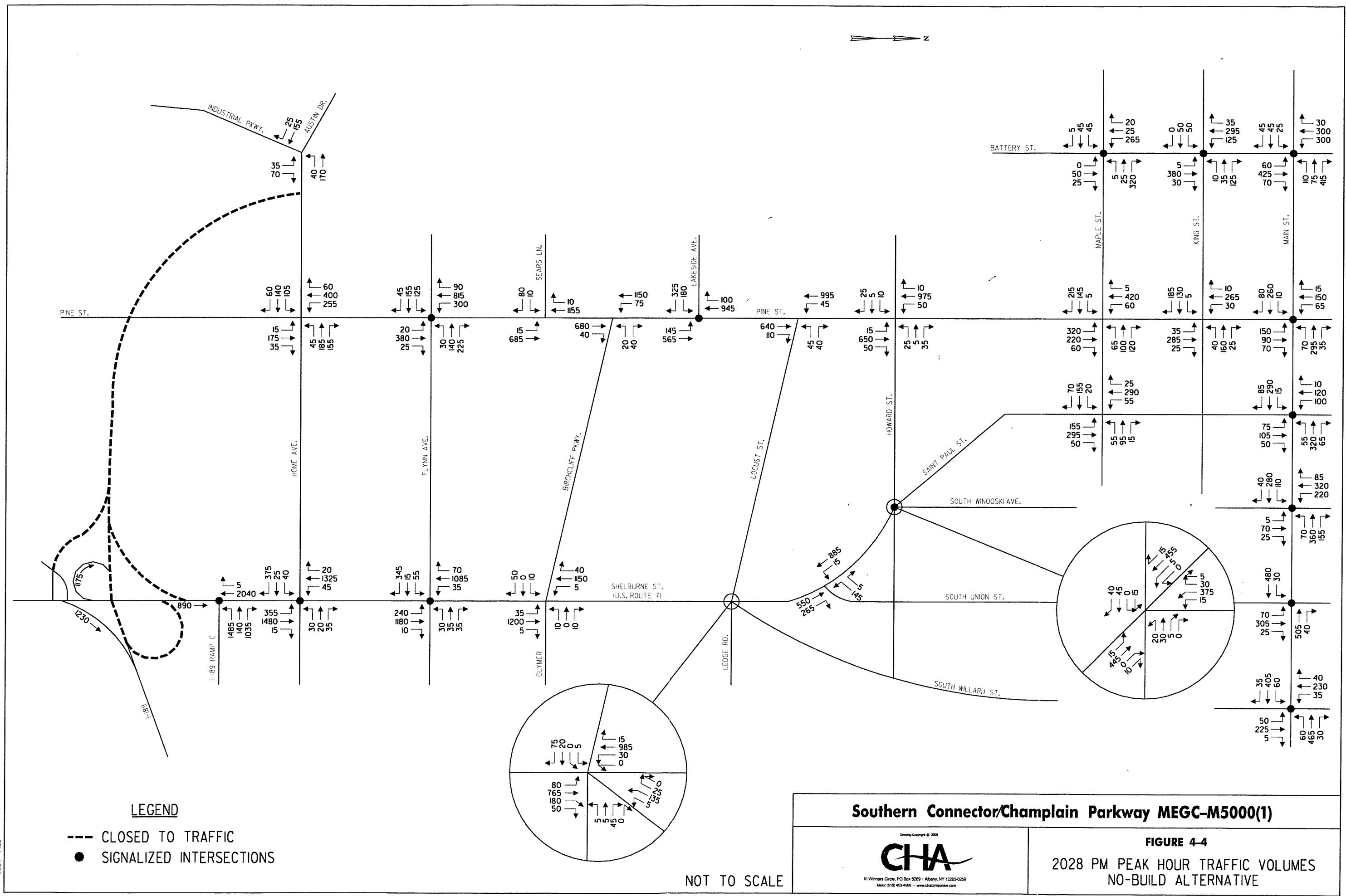
## **Southern Connector/Champlain Parkway MEGC-M5000(1)**

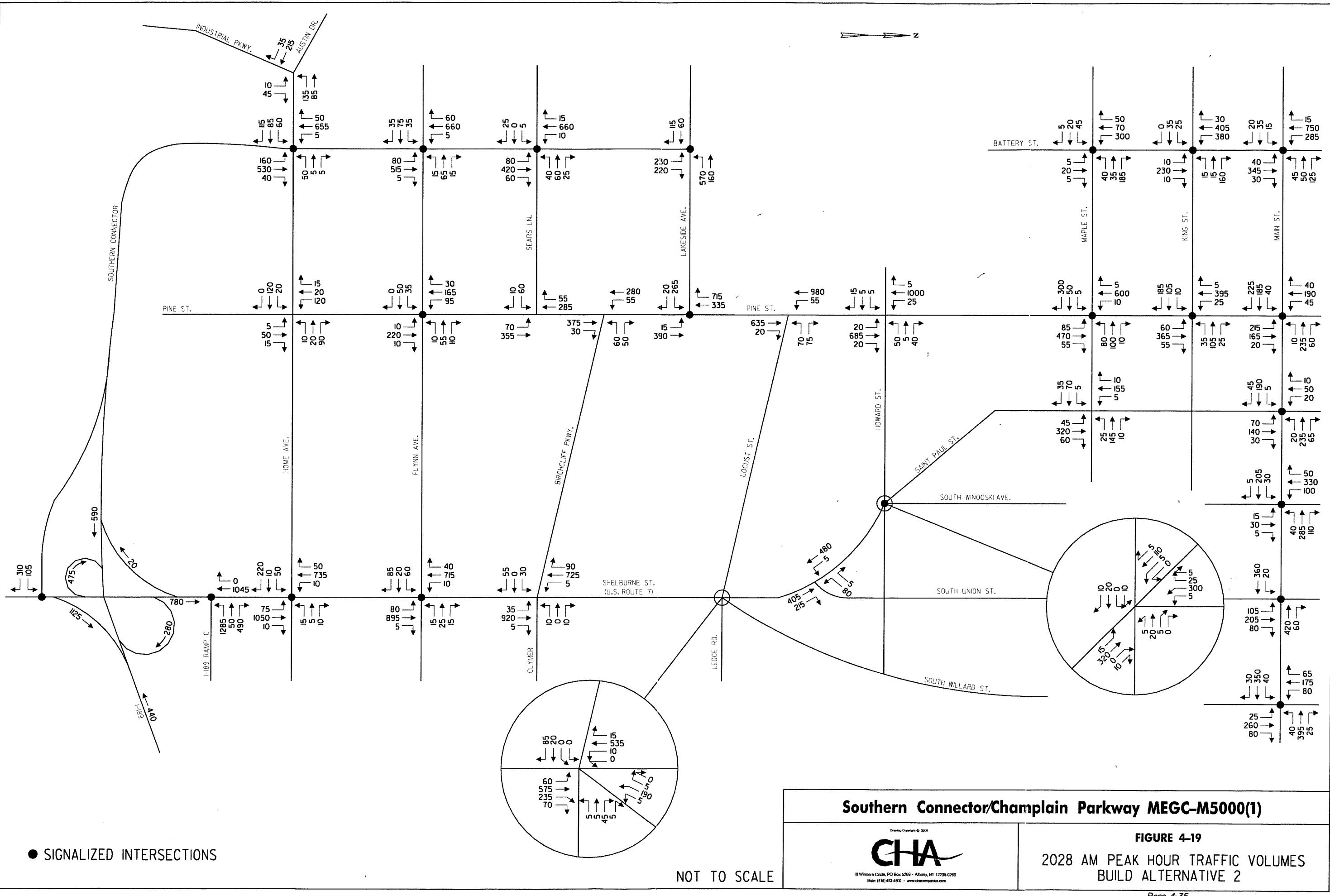


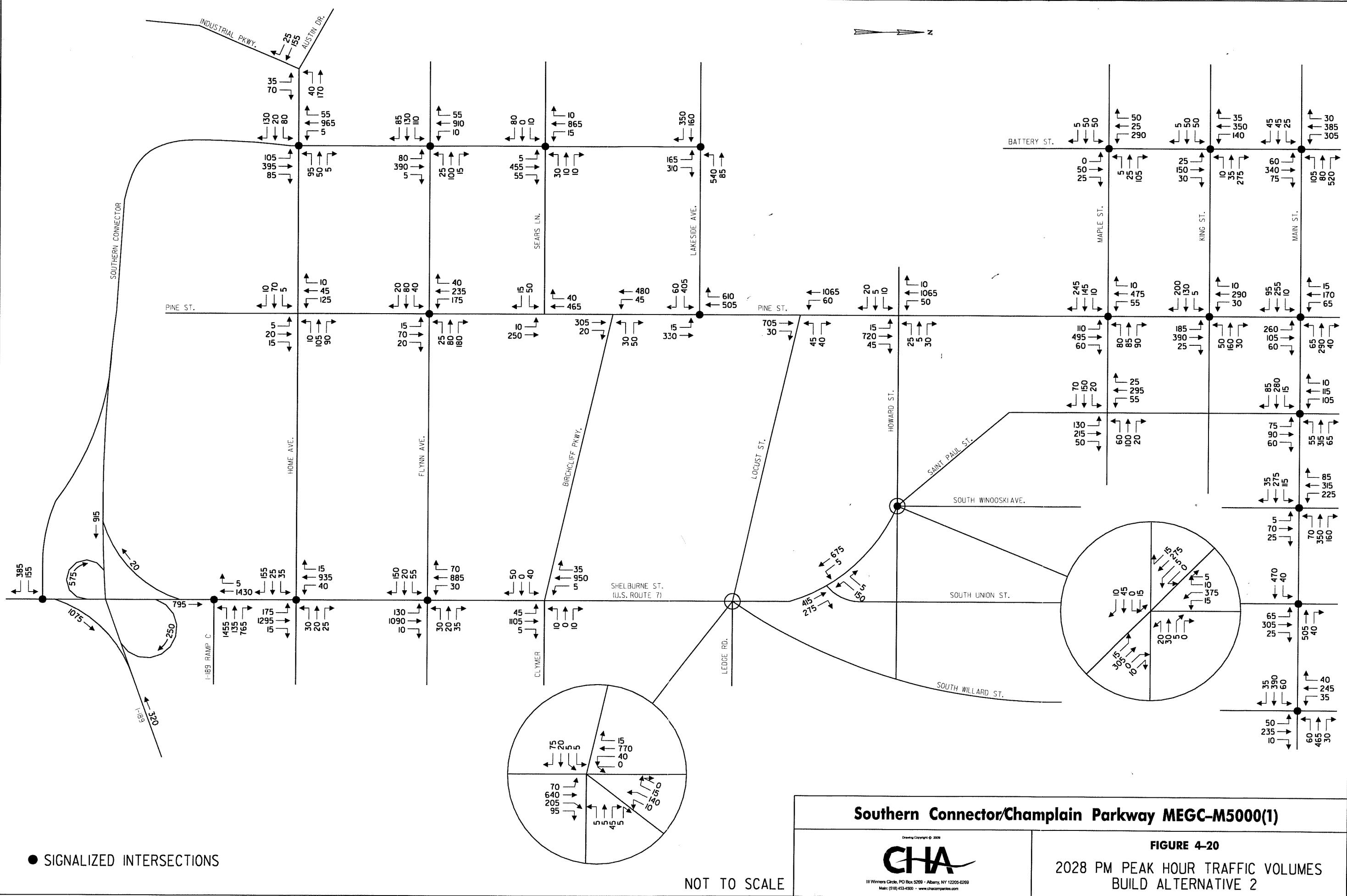
**FIGURE 4-18**

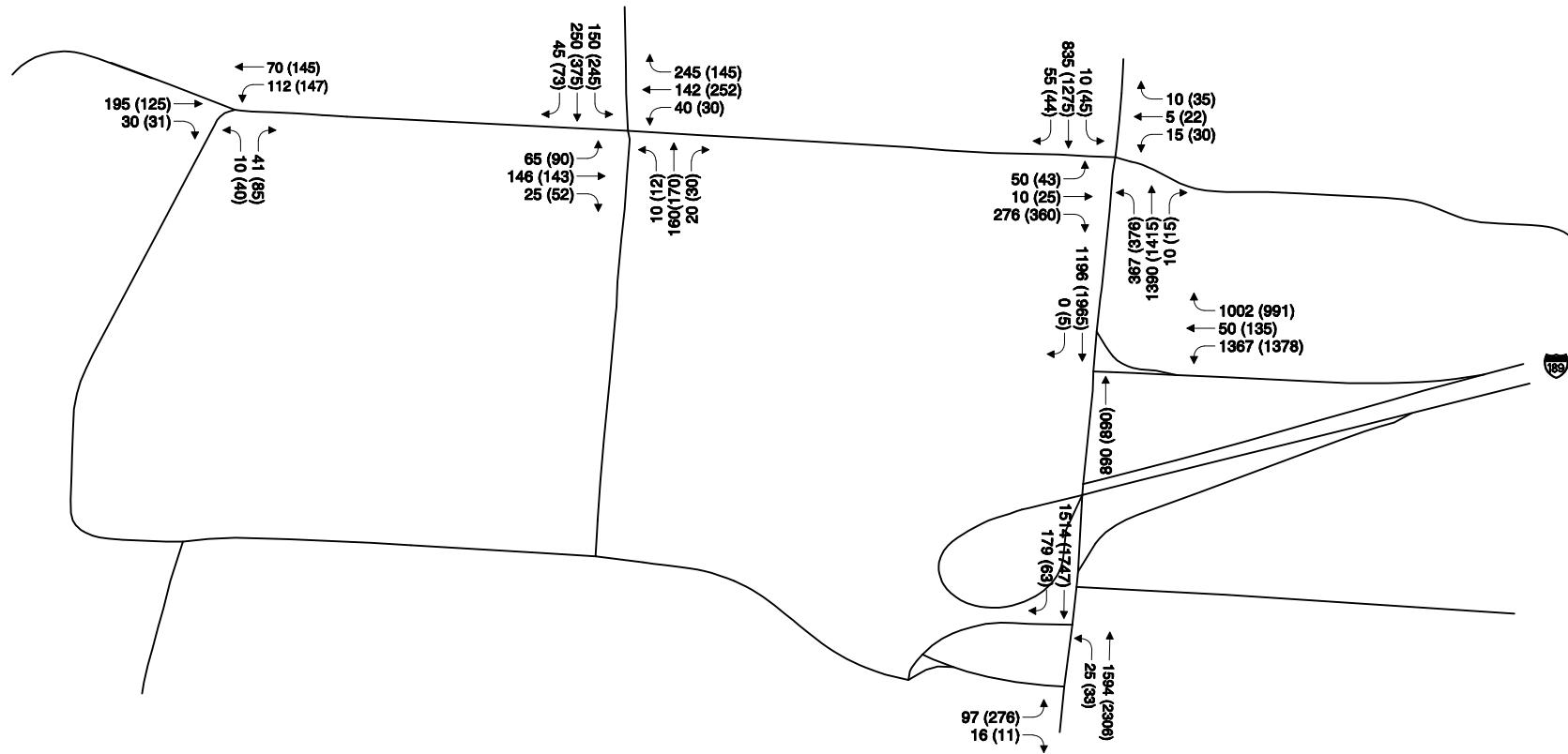
## 2008 PM PEAK HOUR TRAFFIC VOLUMES BUILD ALTERNATIVE 2











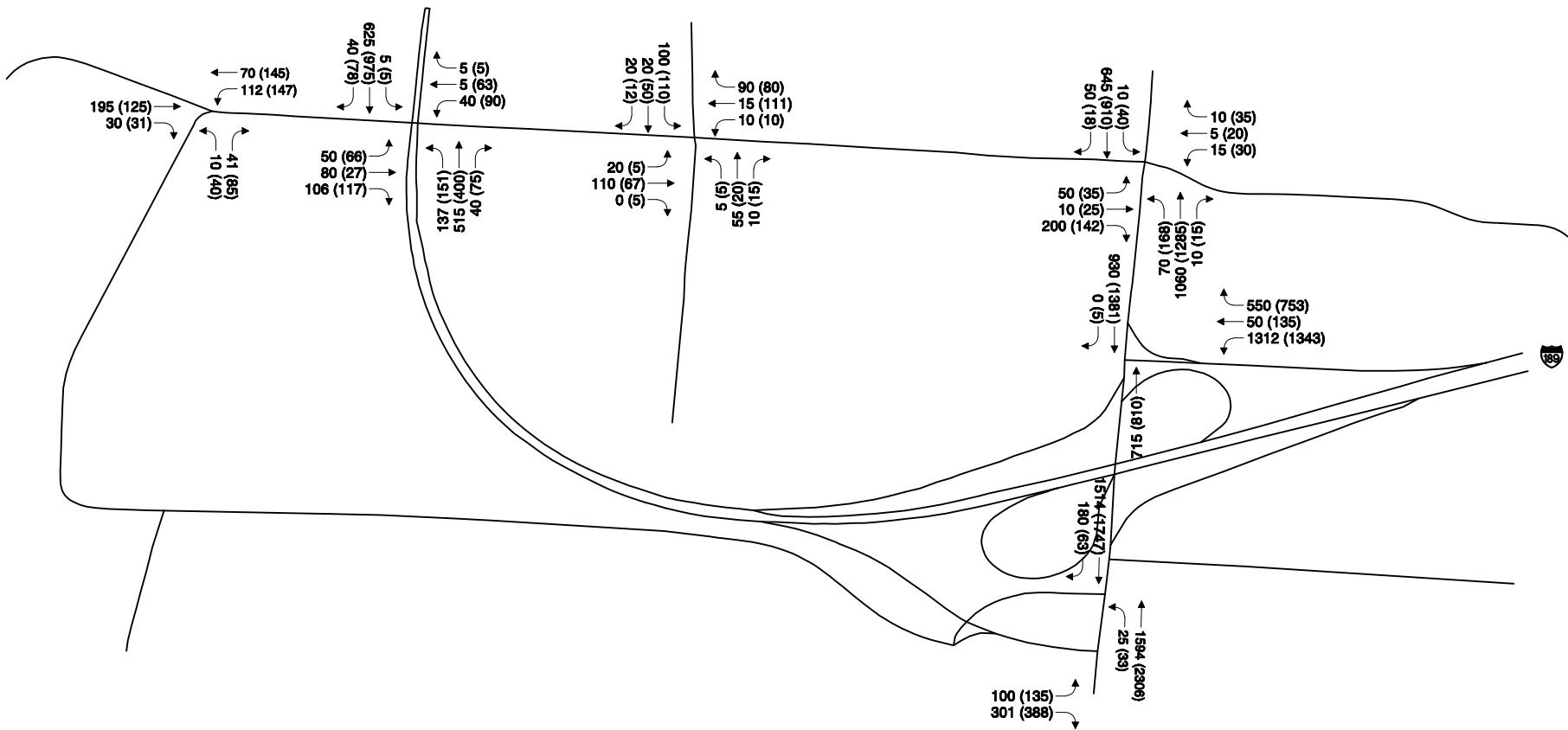
Not to Scale

#### Legend

AM Peak Hour Volume  
(PM Peak Hour Volume)



Figure 4  
Burton 2008 Build Scenario  
Without Champlain Parkway  
Peak Hour Traffic Volumes



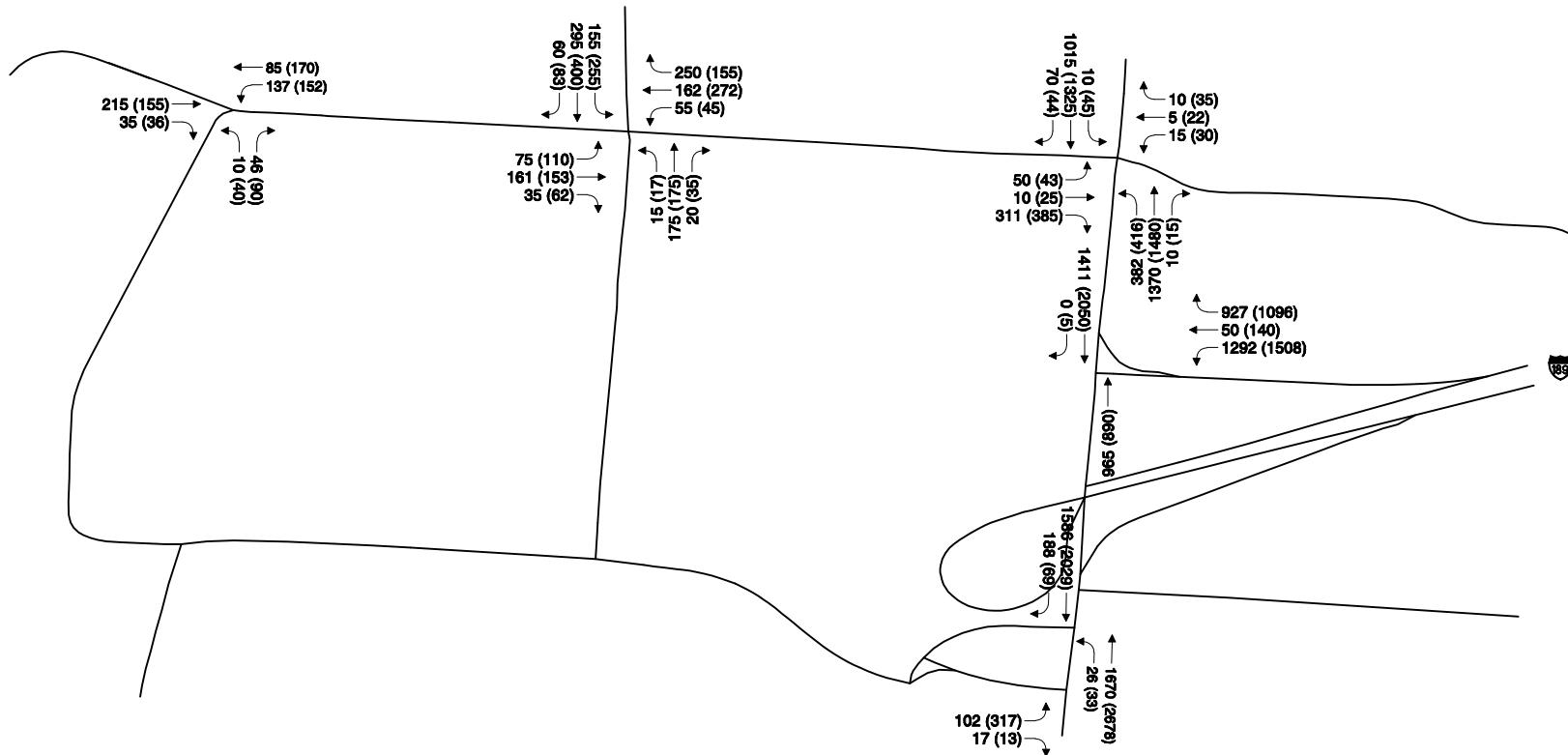
Not to Scale

## Legend

## AM Peak Hour Volume (PM Peak Hour Volume)



Figure 5  
Burton 2008 Build Scenario  
With Champlain Parkway  
Peak Hour Traffic Volumes



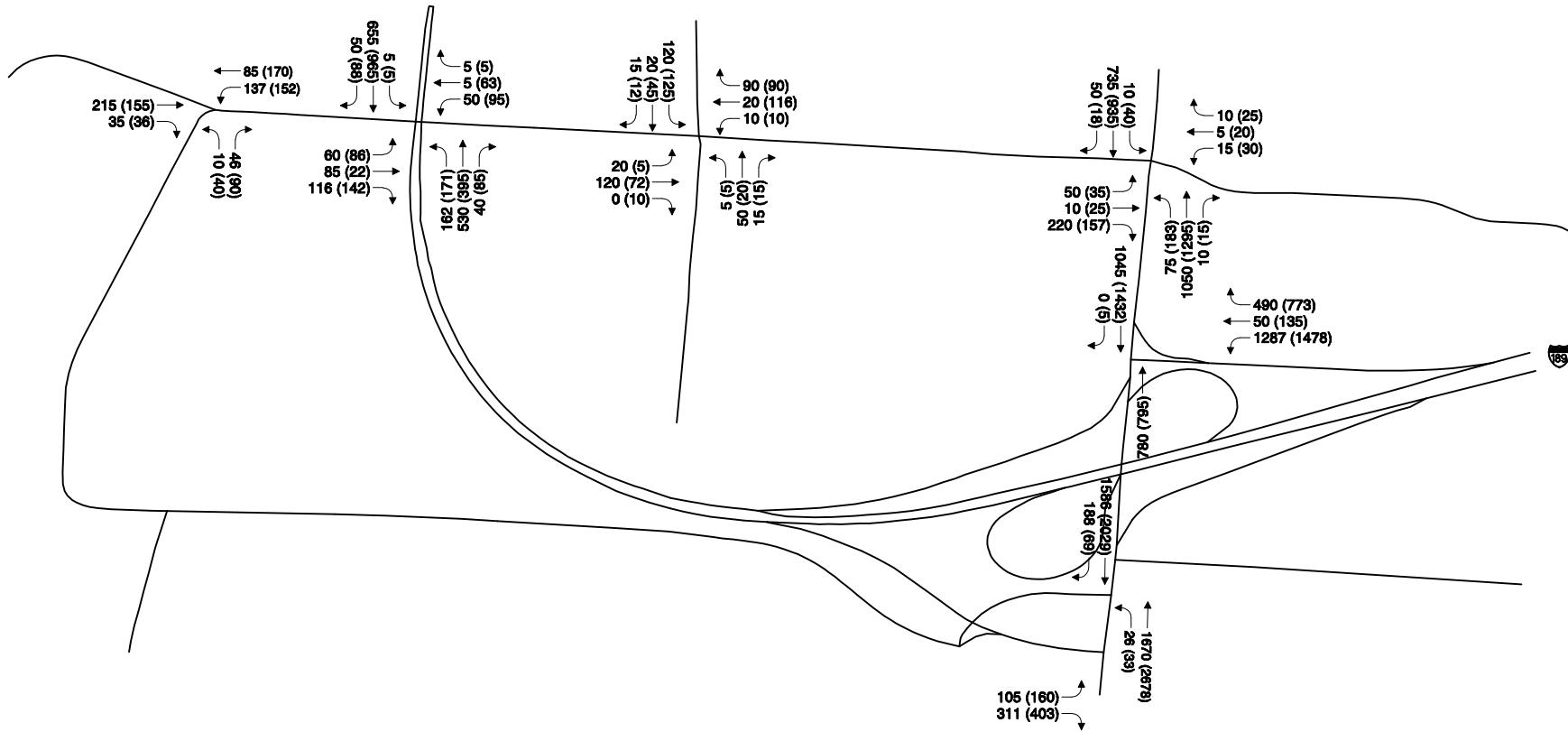
Not to Scale

#### Legend

AM Peak Hour Volume  
(PM Peak Hour Volume)



Figure 6  
Burton 2028 Build Scenario  
Without Champlain Parkway  
Peak Hour Traffic Volumes



Not to Scale

#### Legend

AM Peak Hour Volume  
(PM Peak Hour Volume)



Figure 7  
Burton 2028 Build Scenario  
With Champlain Parkway  
Peak Hour Traffic Volumes

**Trip Generation - Project Specific**

Total Site generated trips (not accounting for internal, pass-by, or diverted trips)

Site Land Uses and Descriptions				AM PK HR OF ADJACENT STREET TRAFFIC										PM PK HR OF ADJACENT STREET TRAFFIC													
Code	Land Use	Size	Unit	directional dist.		average				regression		# trips		Entering	Exiting	directional dist.		average				regression		# trips		Entering	Exiting
				% enter	% exit	# studies	Avg Rate	Std Dev.	Total by Avg	r <sup>2</sup>	total by Eq'n	Method Chosen	Total Trips			#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!			
1	2	3	4	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	Entering	Exiting	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	Entering	Exiting		
710	General Office Building	10.275	1000 sq ft gfa	86%	14%	35	1.16	0.47	12	0.85	36	avg rate	12	10	2	16%	84%	32	1.15	0.42	12	avg rate	12	2	10		
760	Research and Development Ctr	8.745	1000 sq ft gfa	75%	25%	11	0.42	0.41	4			avg rate	4	3	1	15%	85%	5	0.49	0.28	4	avg rate	4	1	4		
140	Manufacturing	18.425	1000 sq ft gfa	77%	23%	45	0.62	1.03	11			avg rate	11	9	3	31%	69%	52	0.67	0.94	12	avg rate	12	4	9		
876	Retail (Apparel Store)	7.825	1000 sq ft gfa	80%	20%	1	1.00		8			avg rate	8	6	2	51%	49%	9	4.12	2.18	32	avg rate	32	16	16		
150	Warehousing	12.545	1000 sq ft gfa	77%	23%	34	0.17	0.20	2			avg rate	2	2	0	27%	73%	47	0.19	0.18	2	avg rate	2	1	2		
930	Fast Casual Restaurant (Café)	6.835	1000 sq ft gfa	67%	33%	1	2.07		14			avg rate	14	9	5	55%	45%	15	14.13	7.72	97	avg rate	97	53	43		
	Performing Arts Center	1500	occupants						0			0	0	0		90%	10%		0.10		149	avg rate	149	134	15		
435	Multipurpose Recreational Facility	7.465	1000 sq ft gfa						0			0	0	0		55%	45%	3	3.58	0.55	27	avg rate	27	15	12		
710	General Office Building	66.3	1000 sq ft gfa						0			0	0	0		16%	84%	32	1.15	0.42	76	avg rate	76	12	64		
150	Warehousing	2.75	1000 sq ft gfa	86%	14%	35	1.16	0.47	77	0.85	89	avg rate	77	66	11	27%	73%	47	0.19	0.18	1	avg rate	1	0	0		
				77%	23%	34	0.17	0.20	0			avg rate	0	0	0												

total      entering      exiting

AM Peak Hour Total Site Trips:	128	106	23
--------------------------------	-----	-----	----

PM Peak Hour Total Site Trips:

412	237	174
-----	-----	-----



---

# Intersection Capacity Analysis

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	275	15	5	10	365	1390	10	10	835	55
Future Volume (vph)	50	10	275	15	5	10	365	1390	10	10	835	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.897			0.999			0.991	
Flt Protected		0.960		0.950			0.950			0.950		
Satd. Flow (prot)	0	1788	1583	1770	1671	0	1770	3536	0	1770	3507	0
Flt Permitted		0.751		0.715			0.249			0.950		
Satd. Flow (perm)	0	1399	1583	1332	1671	0	464	3536	0	1770	3507	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		299			11			1			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1428			412			717			433	
Travel Time (s)		32.5			9.4			16.3			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	299	16	5	11	397	1511	11	11	908	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	299	16	16	0	397	1522	0	11	968	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4			5	2		1	6
Permitted Phases	4		4	4			2					

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Fr <sub>t</sub>	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	3
Permitted Phases	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effect Green (s)	10.3	10.3	10.3	10.3	10.3		68.4	68.4		6.2	48.7	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.76	0.76		0.07	0.54	
v/c Ratio	0.41	0.67	0.11	0.08			0.66	0.57		0.09	0.51	
Control Delay	42.9	12.3	34.5	20.8			20.8	7.1		40.5	14.9	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	42.9	12.3	34.5	20.8			20.8	7.1		40.5	14.9	
LOS	D	B	C	C			C	A		D	B	
Approach Delay		17.8			27.7			10.0			15.2	
Approach LOS		B			C			A			B	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 12.5

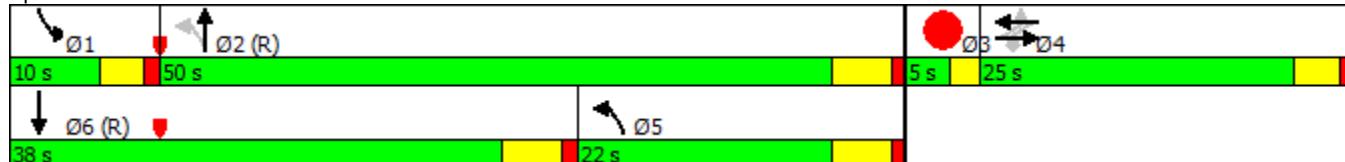
Intersection LOS: B

Intersection Capacity Utilization 66.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

02/28/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	275	15	5	10	365	1390	10	10	835	55
Future Volume (vph)	50	10	275	15	5	10	365	1390	10	10	835	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00			1.00	0.95		1.00	0.95	
Frt	1.00	0.85	1.00	0.90			1.00	1.00		1.00	0.99	
Flt Protected	0.96	1.00	0.95	1.00			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1788	1583	1770	1671			1770	3535		1770	3506	
Flt Permitted	0.75	1.00	0.71	1.00			0.25	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1583	1331	1671			465	3535		1770	3506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	299	16	5	11	397	1511	11	11	908	60
RTOR Reduction (vph)	0	0	265	0	10	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	65	34	16	6	0	397	1522	0	11	964	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	10.3	10.3	10.3	10.3			65.2	65.2		1.5	45.5	
Effective Green, g (s)	10.3	10.3	10.3	10.3			65.2	65.2		1.5	45.5	
Actuated g/C Ratio	0.11	0.11	0.11	0.11			0.72	0.72		0.02	0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	160	181	152	191			629	2560		29	1772	
v/s Ratio Prot				0.00			0.14	c0.43		0.01	c0.27	
v/s Ratio Perm	c0.05	0.02	0.01				c0.32					
v/c Ratio	0.41	0.19	0.11	0.03			0.63	0.59		0.38	0.54	
Uniform Delay, d1	37.0	36.1	35.7	35.4			13.0	6.0		43.8	15.2	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.5	0.3	0.1			2.1	1.0		8.1	1.2	
Delay (s)	38.7	36.6	36.0	35.5			15.1	7.0		51.9	16.4	
Level of Service	D	D	D	D			B	A		D	B	
Approach Delay (s)	37.0			35.8				8.7			16.8	
Approach LOS	D			D			A				B	
Intersection Summary												
HCM 2000 Control Delay		14.5					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		90.0					Sum of lost time (s)			16.0		
Intersection Capacity Utilization		66.7%					ICU Level of Service			C		
Analysis Period (min)		15										
c Critical Lane Group												

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	96	16	0	1523	1514	0	
Future Volume (vph)	96	16	0	1523	1514	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Fr <sub>t</sub>	0.997	0.850					
Flt Protected	0.953						
Satd. Flow (prot)	1770	1504	0	3539	3539	0	
Flt Permitted	0.953						
Satd. Flow (perm)	1770	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	1	15					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	104	17	0	1655	1646	0	
Shared Lane Traffic (%)	10%						
Lane Group Flow (vph)	106	15	0	1655	1646	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1	1		2	2		
Detector Template	Left	Right		Thru	Thru		
Leading Detector (ft)	20	20		100	100		
Trailing Detector (ft)	0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		
Detector 1 Size(ft)	20	20		6	6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type			Cl+Ex	Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0
Total Split (s)	24.0	24.0		82.0	82.0		24.0
Total Split (%)	18.5%	18.5%		63.1%	63.1%		18%
Maximum Green (s)	18.0	18.0		76.0	76.0		22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead					Lag
Lead-Lag Optimize?	Yes	Yes					Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		0.2
Recall Mode	None	None		C-Max	C-Max		None
Walk Time (s)	0.0	0.0		0.0	0.0		5.0
Flash Dont Walk (s)	0.0	0.0		17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0		0	0		0
Act Effect Green (s)	12.1	12.1		105.9	105.9		
Actuated g/C Ratio	0.09	0.09		0.81	0.81		
v/c Ratio	0.64	0.10		0.57	0.57		
Control Delay	73.3	23.0		5.5	5.4		
Queue Delay	0.0	0.0		0.0	3.3		
Total Delay	73.3	23.0		5.5	8.7		
LOS	E	C		A	A		
Approach Delay	67.1			5.5	8.7		
Approach LOS	E			A	A		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 9.2

Intersection LOS: A

Intersection Capacity Utilization 57.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	96	16	0	1523	1514	0
Future Volume (vph)	96	16	0	1523	1514	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1771	1504		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1771	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	104	17	0	1655	1646	0
RTOR Reduction (vph)	1	14	0	0	0	0
Lane Group Flow (vph)	105	1	0	1655	1646	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	12.1	12.1		105.9	105.9	
Effective Green, g (s)	12.1	12.1		105.9	105.9	
Actuated g/C Ratio	0.09	0.09		0.81	0.81	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	164	139		2882	2882	
v/s Ratio Prot	c0.06	0.00		c0.47	0.47	
v/s Ratio Perm						
v/c Ratio	0.64	0.01		0.57	0.57	
Uniform Delay, d1	56.9	53.5		4.2	4.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.3	0.0		0.8	0.8	
Delay (s)	63.1	53.5		5.0	5.0	
Level of Service	E	D		A	A	
Approach Delay (s)	61.9			5.0	5.0	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay		7.0		HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio		0.59				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		57.7%		ICU Level of Service	B	
Analysis Period (min)		15				
c Critical Lane Group						

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1365	50	0	0	890	0	0	1195	0
Future Volume (vph)	0	0	0	1365	50	0	0	890	0	0	1195	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Frt												
Flt Protected					0.950	0.956						
Satd. Flow (prot)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.956						
Satd. Flow (perm)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1484	54	0	0	967	0	0	1299	0
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	772	766	0	0	967	0	0	1299	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2			2			2	
Detector Template				Left	Thru			Thru			Thru	
Leading Detector (ft)				20	100			100			100	
Trailing Detector (ft)				0	0			0			0	
Detector 1 Position(ft)				0	0			0			0	
Detector 1 Size(ft)				20	6			6			6	
Detector 1 Type				Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0			0.0			0.0	
Detector 1 Queue (s)				0.0	0.0			0.0			0.0	
Detector 1 Delay (s)				0.0	0.0			0.0			0.0	
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effect Green (s)				47.2	47.2			31.8			31.8	
Actuated g/C Ratio				0.52	0.52			0.35			0.35	
v/c Ratio				0.88	0.86			0.77			0.72	
Control Delay				31.4	30.1			31.8			28.6	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				31.4	30.1			31.8			28.6	
LOS				C	C			C			C	
Approach Delay					30.8			31.8			28.6	
Approach LOS					C			C			C	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 30.3

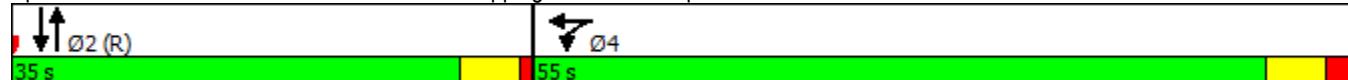
Intersection LOS: C

Intersection Capacity Utilization 73.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1365	50	0	0	890	0	0	1195	0
Future Volume (vph)	0	0	0	1365	50	0	0	890	0	0	1195	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1691			3539		5085	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1691			3539		5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1484	54	0	0	967	0	0	1299	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	772	766	0	0	967	0	0	1299	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				47.2	47.2			31.8			31.8	
Effective Green, g (s)				47.2	47.2			31.8			31.8	
Actuated g/C Ratio				0.52	0.52			0.35			0.35	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				881	886			1250			1796	
v/s Ratio Prot				c0.46	0.45			c0.27			0.26	
v/s Ratio Perm												
v/c Ratio				0.88	0.86			0.77			0.72	
Uniform Delay, d1				18.8	18.6			25.9			25.3	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				9.8	8.8			4.7			2.6	
Delay (s)				28.6	27.4			30.6			27.8	
Level of Service				C	C			C			C	
Approach Delay (s)	0.0				28.0			30.6			27.8	
Approach LOS	A				C			C			C	
Intersection Summary												
HCM 2000 Control Delay				28.6				HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio				0.83								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				73.3%				ICU Level of Service			D	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	25	350	30	20	35	315	1415	15	45	1275	20
Future Volume (vph)	40	25	350	30	20	35	315	1415	15	45	1275	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.905			0.998			0.998	
Flt Protected		0.970		0.950			0.950			0.950		
Satd. Flow (prot)	0	1807	1583	1770	1686	0	1770	3532	0	1770	3532	0
Flt Permitted		0.789		0.711			0.116			0.950		
Satd. Flow (perm)	0	1470	1583	1324	1686	0	216	3532	0	1770	3532	0
Right Turn on Red		Yes			Yes				Yes			Yes
Satd. Flow (RTOR)		380		38			2			2		
Link Speed (mph)		30		30			30			30		
Link Distance (ft)		1428		412			717			433		
Travel Time (s)		32.5		9.4			16.3			9.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	27	380	33	22	38	342	1538	16	49	1386	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	380	33	60	0	342	1554	0	49	1408	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16		16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94		94			94			94		
Detector 2 Size(ft)		6		6			6			6		
Detector 2 Type		Cl+Ex		Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)		0.0		0.0			0.0			0.0		
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases	4		4	4			5	2		1	6	
Permitted Phases	4		4	4			2					

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Fr <sub>t</sub>	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	3
Permitted Phases	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effect Green (s)	11.3	11.3	11.3	11.3	11.3		61.8	61.8		7.9	47.7	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.69	0.69		0.09	0.53	
v/c Ratio	0.38	0.72	0.20	0.24			0.78	0.64		0.31	0.75	
Control Delay	40.0	11.9	35.4	18.5			39.3	12.2		43.1	21.2	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	40.0	11.9	35.4	18.5			39.3	12.2		43.1	21.2	
LOS	D	B	D	B			D	B		D	C	
Approach Delay		16.2			24.5			17.1			21.9	
Approach LOS		B			C			B			C	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 19.0

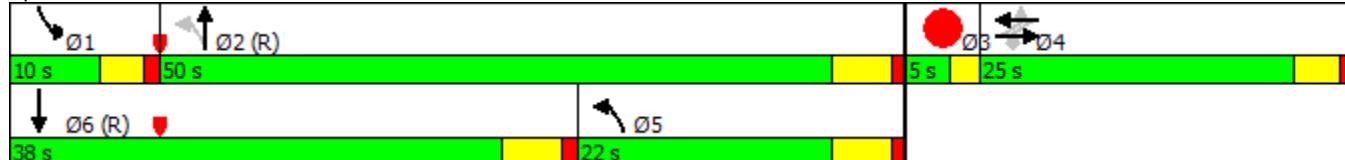
Intersection LOS: B

Intersection Capacity Utilization 75.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	25	350	30	20	35	315	1415	15	45	1275	20
Future Volume (vph)	40	25	350	30	20	35	315	1415	15	45	1275	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95		
Frt	1.00	0.85	1.00	0.91			1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.97	1.00	0.95	1.00			0.95	1.00	0.95	1.00		
Satd. Flow (prot)	1807	1583	1770	1686			1770	3534	1770	3531		
Flt Permitted	0.79	1.00	0.71	1.00			0.12	1.00	0.95	1.00		
Satd. Flow (perm)	1470	1583	1325	1686			216	3534	1770	3531		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	43	27	380	33	22	38	342	1538	16	49	1386	22
RTOR Reduction (vph)	0	0	332	0	33	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	70	48	33	27	0	342	1553	0	49	1407	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	11.3	11.3	11.3	11.3			60.2	60.2		5.5	46.1	
Effective Green, g (s)	11.3	11.3	11.3	11.3			60.2	60.2		5.5	46.1	
Actuated g/C Ratio	0.13	0.13	0.13	0.13			0.67	0.67		0.06	0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	184	198	166	211			465	2363		108	1808	
v/s Ratio Prot				0.02			c0.15	0.44		0.03	c0.40	
v/s Ratio Perm	c0.05	0.03	0.02				0.34					
v/c Ratio	0.38	0.24	0.20	0.13			0.74	0.66		0.45	0.78	
Uniform Delay, d1	36.1	35.5	35.3	35.0			21.1	8.8		40.8	17.8	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.6	0.6	0.3			6.0	1.4		3.0	3.4	
Delay (s)	37.5	36.1	35.9	35.2			27.1	10.3		43.8	21.2	
Level of Service	D	D	D	D			C	B		D	C	
Approach Delay (s)	36.3			35.5				13.3			21.9	
Approach LOS	D			D				B			C	

### Intersection Summary

HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	256	8	0	2055	1747	0	
Future Volume (vph)	256	8	0	2055	1747	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Fr <sub>t</sub>	0.999	0.850					
Flt Protected	0.953						
Satd. Flow (prot)	1773	1504	0	3539	3539	0	
Flt Permitted	0.953						
Satd. Flow (perm)	1773	1504	0	3539	3539	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		8					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	278	9	0	2234	1899	0	
Shared Lane Traffic (%)		10%					
Lane Group Flow (vph)	279	8	0	2234	1899	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1	1		2	2		
Detector Template	Left	Right		Thru	Thru		
Leading Detector (ft)	20	20		100	100		
Trailing Detector (ft)	0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		
Detector 1 Size(ft)	20	20		6	6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type			Cl+Ex	Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2		3
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0		1.0

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0
Total Split (s)	24.0	24.0		82.0	82.0		24.0
Total Split (%)	18.5%	18.5%		63.1%	63.1%		18%
Maximum Green (s)	18.0	18.0		76.0	76.0		22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead					Lag
Lead-Lag Optimize?	Yes	Yes					Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		0.2
Recall Mode	None	None		C-Max	C-Max		None
Walk Time (s)	0.0	0.0		0.0	0.0		5.0
Flash Dont Walk (s)	0.0	0.0		17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0		0	0		0
Act Effect Green (s)	18.0	18.0		100.0	100.0		
Actuated g/C Ratio	0.14	0.14		0.77	0.77		
v/c Ratio	1.14	0.04		0.82	0.70		
Control Delay	149.5	26.1		12.7	9.2		
Queue Delay	0.0	0.0		0.0	23.6		
Total Delay	149.5	26.1		12.7	32.7		
LOS	F	C		B	C		
Approach Delay	146.1			12.7	32.7		
Approach LOS	F			B	C		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 30.0

Intersection LOS: C

Intersection Capacity Utilization 81.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	256	8	0	2055	1747	0
Future Volume (vph)	256	8	0	2055	1747	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1773	1504		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1773	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	278	9	0	2234	1899	0
RTOR Reduction (vph)	0	7	0	0	0	0
Lane Group Flow (vph)	279	1	0	2234	1899	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	18.0	18.0		100.0	100.0	
Effective Green, g (s)	18.0	18.0		100.0	100.0	
Actuated g/C Ratio	0.14	0.14		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	245	208		2722	2722	
v/s Ratio Prot	c0.16	0.00		c0.63	0.54	
v/s Ratio Perm						
v/c Ratio	1.14	0.01		0.82	0.70	
Uniform Delay, d1	56.0	48.3		9.4	7.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	100.1	0.0		2.9	1.5	
Delay (s)	156.1	48.3		12.3	9.0	
Level of Service	F	D		B	A	
Approach Delay (s)	153.1			12.3	9.0	
Approach LOS	F			B	A	
Intersection Summary						
HCM 2000 Control Delay		20.0		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		0.88				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		81.2%		ICU Level of Service	D	
Analysis Period (min)		15				
c Critical Lane Group						

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1355	135	0	0	890	0	0	1955	5
Future Volume (vph)	0	0	0	1355	135	0	0	890	0	0	1955	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt												
Flt Protected					0.950	0.961						
Satd. Flow (prot)	0	0	0	1681	1701	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.961						
Satd. Flow (perm)	0	0	0	1681	1701	0	0	3539	0	0	5085	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1473	147	0	0	967	0	0	2125	5
Shared Lane Traffic (%)				45%								
Lane Group Flow (vph)	0	0	0	810	810	0	0	967	0	0	2130	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2			2			2	
Detector Template				Left	Thru			Thru			Thru	
Leading Detector (ft)				20	100			100			100	
Trailing Detector (ft)				0	0			0			0	
Detector 1 Position(ft)				0	0			0			0	
Detector 1 Size(ft)				20	6			6			6	
Detector 1 Type				Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0			0.0			0.0	
Detector 1 Queue (s)				0.0	0.0			0.0			0.0	
Detector 1 Delay (s)				0.0	0.0			0.0			0.0	
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effect Green (s)				47.9	47.9			31.1			31.1	
Actuated g/C Ratio				0.53	0.53			0.35			0.35	
v/c Ratio				0.91	0.90			0.79			1.21	
Control Delay				34.5	33.1			32.7			130.1	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				34.5	33.1			32.7			130.1	
LOS				C	C			C			F	
Approach Delay						33.8		32.7			130.1	
Approach LOS						C		C			F	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.21

Intersection Signal Delay: 77.0

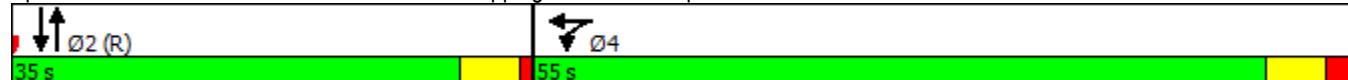
Intersection LOS: E

Intersection Capacity Utilization 88.1%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1355	135	0	0	890	0	0	1955	5
Future Volume (vph)	0	0	0	1355	135	0	0	890	0	0	1955	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1700			3539		5084	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1700			3539		5084	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1473	147	0	0	967	0	0	2125	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	810	810	0	0	967	0	0	2130	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				47.9	47.9			31.1			31.1	
Effective Green, g (s)				47.9	47.9			31.1			31.1	
Actuated g/C Ratio				0.53	0.53			0.35			0.35	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				894	904			1222			1756	
v/s Ratio Prot				c0.48	0.48			0.27			c0.42	
v/s Ratio Perm												
v/c Ratio				0.91	0.90			0.79			1.21	
Uniform Delay, d1				19.0	18.8			26.5			29.4	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				12.6	11.4			5.3			101.4	
Delay (s)				31.6	30.2			31.8			130.8	
Level of Service				C	C			C			F	
Approach Delay (s)	0.0				30.9			31.8			130.8	
Approach LOS	A				C			C			F	
Intersection Summary												
HCM 2000 Control Delay				76.2				HCM 2000 Level of Service			E	
HCM 2000 Volume to Capacity ratio				1.03								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				88.1%				ICU Level of Service			E	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	310	15	5	10	380	1370	10	10	1015	70
Future Volume (vph)	50	10	310	15	5	10	380	1370	10	10	1015	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.897			0.999			0.990	
Flt Protected		0.960		0.950			0.950			0.950		
Satd. Flow (prot)	0	1788	1583	1770	1671	0	1770	3536	0	1770	3504	0
Flt Permitted		0.751		0.715			0.170			0.950		
Satd. Flow (perm)	0	1399	1583	1332	1671	0	317	3536	0	1770	3504	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		337		11			1			9		
Link Speed (mph)		30		30			30			30		
Link Distance (ft)		1428		412			717			433		
Travel Time (s)		32.5		9.4			16.3			9.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	337	16	5	11	413	1489	11	11	1103	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	337	16	16	0	413	1500	0	11	1179	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12		12			12			12		
Link Offset(ft)		0		0			0			0		
Crosswalk Width(ft)		16		16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94		94			94			94		
Detector 2 Size(ft)		6		6			6			6		
Detector 2 Type		Cl+Ex		Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)		0.0		0.0			0.0			0.0		
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases	4		4	4			5	2		1	6	
Permitted Phases	4		4	4			2					

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Fr <sub>t</sub>	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	3
Permitted Phases	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effect Green (s)	10.5	10.5	10.5	10.5	10.5		68.2	68.2		6.2	48.5	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.76	0.76		0.07	0.54	
v/c Ratio	0.40	0.70	0.10	0.08			0.80	0.56		0.09	0.62	
Control Delay	42.3	12.4	34.1	20.5			34.6	7.2		40.5	17.0	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	42.3	12.4	34.1	20.5			34.6	7.2		40.5	17.0	
LOS	D	B	C	C			C	A		D	B	
Approach Delay		17.2			27.3			13.1			17.2	
Approach LOS		B			C			B			B	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 15.1

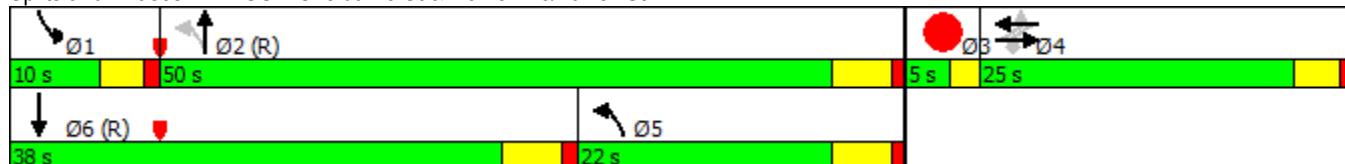
Intersection LOS: B

Intersection Capacity Utilization 73.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	310	15	5	10	380	1370	10	10	1015	70
Future Volume (vph)	50	10	310	15	5	10	380	1370	10	10	1015	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95		
Frt	1.00	0.85	1.00	0.90			1.00	1.00		1.00	0.99	
Flt Protected	0.96	1.00	0.95	1.00			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1788	1583	1770	1671			1770	3535		1770	3505	
Flt Permitted	0.75	1.00	0.71	1.00			0.17	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1583	1331	1671			317	3535		1770	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	337	16	5	11	413	1489	11	11	1103	76
RTOR Reduction (vph)	0	0	298	0	10	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	65	39	16	6	0	413	1500	0	11	1175	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	10.5	10.5	10.5	10.5			65.0	65.0		1.5	45.3	
Effective Green, g (s)	10.5	10.5	10.5	10.5			65.0	65.0		1.5	45.3	
Actuated g/C Ratio	0.12	0.12	0.12	0.12			0.72	0.72		0.02	0.50	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	163	184	155	194			555	2553		29	1764	
v/s Ratio Prot				0.00			c0.17	0.42		0.01	c0.34	
v/s Ratio Perm	c0.05	0.02	0.01				c0.37					
v/c Ratio	0.40	0.21	0.10	0.03			0.74	0.59		0.38	0.67	
Uniform Delay, d1	36.8	36.0	35.5	35.2			17.0	6.0		43.8	16.7	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.6	0.3	0.1			5.4	1.0		8.1	2.0	
Delay (s)	38.4	36.6	35.8	35.3			22.4	7.0		51.9	18.7	
Level of Service	D	D	D	D			C	A		D	B	
Approach Delay (s)	36.9			35.6				10.4			19.0	
Approach LOS	D			D			B				B	

### Intersection Summary

HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	101	17	0	1596	1586	0	
Future Volume (vph)	101	17	0	1596	1586	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Frt	0.997	0.850					
Flt Protected	0.953						
Satd. Flow (prot)	1770	1504	0	3539	3539	0	
Flt Permitted	0.953						
Satd. Flow (perm)	1770	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	1	16					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	110	18	0	1735	1724	0	
Shared Lane Traffic (%)	10%						
Lane Group Flow (vph)	112	16	0	1735	1724	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1	1		2	2		
Detector Template	Left	Right		Thru	Thru		
Leading Detector (ft)	20	20		100	100		
Trailing Detector (ft)	0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		
Detector 1 Size(ft)	20	20		6	6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type			Cl+Ex	Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0
Total Split (s)	24.0	24.0		82.0	82.0		24.0
Total Split (%)	18.5%	18.5%		63.1%	63.1%		18%
Maximum Green (s)	18.0	18.0		76.0	76.0		22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead					Lag
Lead-Lag Optimize?	Yes	Yes					Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		0.2
Recall Mode	None	None		C-Max	C-Max		None
Walk Time (s)	0.0	0.0		0.0	0.0		5.0
Flash Dont Walk (s)	0.0	0.0		17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0		0	0		0
Act Effect Green (s)	12.5	12.5		105.5	105.5		
Actuated g/C Ratio	0.10	0.10		0.81	0.81		
v/c Ratio	0.65	0.10		0.60	0.60		
Control Delay	73.4	22.2		6.0	5.9		
Queue Delay	0.0	0.0		0.0	4.2		
Total Delay	73.4	22.2		6.0	10.2		
LOS	E	C		A	B		
Approach Delay	67.0			6.0	10.2		
Approach LOS	E			A	B		

## Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 10.2

Intersection LOS: B

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	101	17	0	1596	1586	0
Future Volume (vph)	101	17	0	1596	1586	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1771	1504		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1771	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	18	0	1735	1724	0
RTOR Reduction (vph)	1	14	0	0	0	0
Lane Group Flow (vph)	111	2	0	1735	1724	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	12.5	12.5		105.5	105.5	
Effective Green, g (s)	12.5	12.5		105.5	105.5	
Actuated g/C Ratio	0.10	0.10		0.81	0.81	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	170	144		2872	2872	
v/s Ratio Prot	c0.06	0.00		c0.49	0.49	
v/s Ratio Perm						
v/c Ratio	0.65	0.01		0.60	0.60	
Uniform Delay, d1	56.7	53.2		4.5	4.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.7	0.0		1.0	0.9	
Delay (s)	63.4	53.2		5.5	5.4	
Level of Service	E	D		A	A	
Approach Delay (s)	62.1			5.5	5.4	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay		7.5		HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio		0.62				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		60.1%		ICU Level of Service	B	
Analysis Period (min)		15				
c Critical Lane Group						

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1290	50	0	0	965	0	0	1410	0
Future Volume (vph)	0	0	0	1290	50	0	0	965	0	0	1410	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Frt												
Flt Protected					0.950	0.956						
Satd. Flow (prot)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.956						
Satd. Flow (perm)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1402	54	0	0	1049	0	0	1533	0
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	729	727	0	0	1049	0	0	1533	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2			2			2	
Detector Template				Left	Thru			Thru			Thru	
Leading Detector (ft)				20	100			100			100	
Trailing Detector (ft)				0	0			0			0	
Detector 1 Position(ft)				0	0			0			0	
Detector 1 Size(ft)				20	6			6			6	
Detector 1 Type				Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0			0.0			0.0	
Detector 1 Queue (s)				0.0	0.0			0.0			0.0	
Detector 1 Delay (s)				0.0	0.0			0.0			0.0	
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effect Green (s)				46.2	46.2			32.8			32.8	
Actuated g/C Ratio				0.51	0.51			0.36			0.36	
v/c Ratio				0.84	0.84			0.81			0.83	
Control Delay				29.0	28.3			33.2			31.8	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				29.0	28.3			33.2			31.8	
LOS				C	C			C			C	
Approach Delay						28.7		33.2			31.8	
Approach LOS						C		C			C	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 31.0

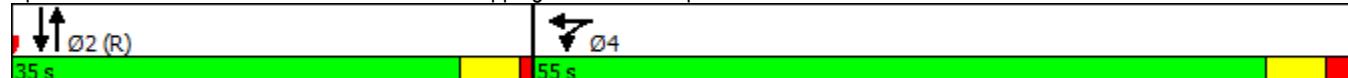
Intersection LOS: C

Intersection Capacity Utilization 73.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

02/28/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1290	50	0	0	965	0	0	1410	0
Future Volume (vph)	0	0	0	1290	50	0	0	965	0	0	1410	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1691			3539		5085	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1691			3539		5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1402	54	0	0	1049	0	0	1533	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	729	727	0	0	1049	0	0	1533	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				46.2	46.2			32.8			32.8	
Effective Green, g (s)				46.2	46.2			32.8			32.8	
Actuated g/C Ratio				0.51	0.51			0.36			0.36	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				862	868			1289			1853	
v/s Ratio Prot				c0.43	0.43			0.30			c0.30	
v/s Ratio Perm												
v/c Ratio				0.85	0.84			0.81			0.83	
Uniform Delay, d1				18.8	18.7			25.8			26.0	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				7.7	7.1			5.7			4.4	
Delay (s)				26.5	25.8			31.6			30.4	
Level of Service				C	C			C			C	
Approach Delay (s)	0.0				26.1			31.6			30.4	
Approach LOS	A				C			C			C	
Intersection Summary												
HCM 2000 Control Delay				29.2				HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio				0.84								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				73.5%				ICU Level of Service			D	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	25	375	30	20	35	355	1480	15	45	1325	20
Future Volume (vph)	40	25	375	30	20	35	355	1480	15	45	1325	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.905			0.999			0.998	
Flt Protected		0.970		0.950			0.950			0.950		
Satd. Flow (prot)	0	1807	1583	1770	1686	0	1770	3536	0	1770	3532	0
Flt Permitted		0.791		0.711			0.099			0.950		
Satd. Flow (perm)	0	1473	1583	1324	1686	0	184	3536	0	1770	3532	0
Right Turn on Red		Yes			Yes				Yes			Yes
Satd. Flow (RTOR)		408		38			2			2		
Link Speed (mph)		30		30			30			30		
Link Distance (ft)		1428		412			717			433		
Travel Time (s)		32.5		9.4			16.3			9.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	27	408	33	22	38	386	1609	16	49	1440	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	408	33	60	0	386	1625	0	49	1462	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16		16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94		94			94			94		
Detector 2 Size(ft)		6		6			6			6		
Detector 2 Type		Cl+Ex		Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)		0.0		0.0			0.0			0.0		
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases	4		4	4			5	2		1	6	
Permitted Phases	4		4	4			2					

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Fr <sub>t</sub>	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	3
Permitted Phases	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effect Green (s)	11.6	11.6	11.6	11.6	11.6		61.5	61.5		7.9	47.4	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.68	0.68		0.09	0.53	
v/c Ratio	0.37	0.73	0.19	0.24			0.91	0.67		0.31	0.79	
Control Delay	39.1	11.8	34.7	18.1			56.5	13.4		43.1	22.7	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	39.1	11.8	34.7	18.1			56.5	13.4		43.1	22.7	
LOS	D	B	C	B			E	B		D	C	
Approach Delay	15.8				24.0			21.6			23.4	
Approach LOS	B				C			C			C	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 21.6

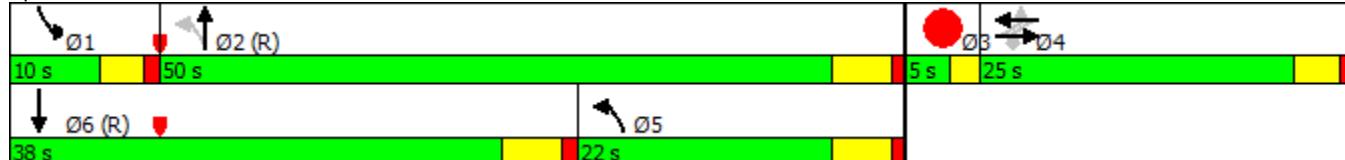
Intersection LOS: C

Intersection Capacity Utilization 78.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

02/28/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	25	375	30	20	35	355	1480	15	45	1325	20
Future Volume (vph)	40	25	375	30	20	35	355	1480	15	45	1325	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95		
Frt	1.00	0.85	1.00	0.91			1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.97	1.00	0.95	1.00			0.95	1.00	0.95	1.00		
Satd. Flow (prot)	1807	1583	1770	1686			1770	3534	1770	3531		
Flt Permitted	0.79	1.00	0.71	1.00			0.10	1.00	0.95	1.00		
Satd. Flow (perm)	1474	1583	1325	1686			185	3534	1770	3531		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	43	27	408	33	22	38	386	1609	16	49	1440	22
RTOR Reduction (vph)	0	0	355	0	33	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	70	53	33	27	0	386	1624	0	49	1461	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	11.6	11.6	11.6	11.6	11.6		59.9	59.9		5.5	45.8	
Effective Green, g (s)	11.6	11.6	11.6	11.6	11.6		59.9	59.9		5.5	45.8	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.67	0.67		0.06	0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	189	204	170	217			450	2352		108	1796	
v/s Ratio Prot				0.02			c0.18	0.46		0.03	c0.41	
v/s Ratio Perm	c0.05	0.03	0.02				c0.39					
v/c Ratio	0.37	0.26	0.19	0.12			0.86	0.69		0.45	0.81	
Uniform Delay, d1	35.9	35.3	35.0	34.7			23.5	9.3		40.8	18.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.7	0.6	0.3			14.9	1.7		3.0	4.2	
Delay (s)	37.1	36.0	35.6	35.0			38.4	11.0		43.8	22.7	
Level of Service	D	D	D	C			D	B		D	C	
Approach Delay (s)	36.2			35.2				16.3			23.4	
Approach LOS	D			D			B			C		
Intersection Summary												
HCM 2000 Control Delay		21.6					HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio		0.80										
Actuated Cycle Length (s)		90.0					Sum of lost time (s)			16.0		
Intersection Capacity Utilization		78.8%					ICU Level of Service			D		
Analysis Period (min)		15										
c Critical Lane Group												

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	297	9	0	2386	2029	0	
Future Volume (vph)	297	9	0	2386	2029	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Frt			0.850				
Flt Protected		0.953					
Satd. Flow (prot)	1775	1504	0	3539	3539	0	
Flt Permitted		0.953					
Satd. Flow (perm)	1775	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)		9					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	323	10	0	2593	2205	0	
Shared Lane Traffic (%)		10%					
Lane Group Flow (vph)	324	9	0	2593	2205	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1	1		2	2		
Detector Template	Left	Right		Thru	Thru		
Leading Detector (ft)	20	20		100	100		
Trailing Detector (ft)	0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		
Detector 1 Size(ft)	20	20		6	6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type			Cl+Ex	Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0
Total Split (s)	24.0	24.0		82.0	82.0		24.0
Total Split (%)	18.5%	18.5%		63.1%	63.1%		18%
Maximum Green (s)	18.0	18.0		76.0	76.0		22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead					Lag
Lead-Lag Optimize?	Yes	Yes					Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		0.2
Recall Mode	None	None		C-Max	C-Max		None
Walk Time (s)	0.0	0.0		0.0	0.0		5.0
Flash Dont Walk (s)	0.0	0.0		17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0		0	0		0
Act Effect Green (s)	18.0	18.0		100.0	100.0		
Actuated g/C Ratio	0.14	0.14		0.77	0.77		
v/c Ratio	1.32	0.04		0.95	0.81		
Control Delay	213.7	24.8		23.0	12.3		
Queue Delay	0.0	0.0		0.0	46.1		
Total Delay	213.7	24.8		23.0	58.5		
LOS	F	C		C	E		
Approach Delay	208.6			23.0	58.5		
Approach LOS	F			C	E		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.32

Intersection Signal Delay: 50.3

Intersection LOS: D

Intersection Capacity Utilization 152.0%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	297	9	0	2386	2029	0
Future Volume (vph)	297	9	0	2386	2029	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1773	1504		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1773	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	323	10	0	2593	2205	0
RTOR Reduction (vph)	0	8	0	0	0	0
Lane Group Flow (vph)	324	1	0	2593	2205	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	18.0	18.0		100.0	100.0	
Effective Green, g (s)	18.0	18.0		100.0	100.0	
Actuated g/C Ratio	0.14	0.14		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	245	208		2722	2722	
v/s Ratio Prot	c0.18	0.00		c0.73	0.62	
v/s Ratio Perm						
v/c Ratio	1.32	0.01		0.95	0.81	
Uniform Delay, d1	56.0	48.3		13.0	9.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	170.7	0.0		9.3	2.7	
Delay (s)	226.7	48.3		22.2	11.9	
Level of Service	F	D		C	B	
Approach Delay (s)	221.9			22.2	11.9	
Approach LOS	F			C	B	
Intersection Summary						
HCM 2000 Control Delay		30.8		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		1.03				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		152.0%		ICU Level of Service	H	
Analysis Period (min)		15				
c Critical Lane Group						

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1485	140	0	0	890	0	0	2040	5
Future Volume (vph)	0	0	0	1485	140	0	0	890	0	0	2040	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt												
Flt Protected					0.950	0.960						
Satd. Flow (prot)	0	0	0	1681	1699	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.960						
Satd. Flow (perm)	0	0	0	1681	1699	0	0	3539	0	0	5085	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1614	152	0	0	967	0	0	2217	5
Shared Lane Traffic (%)				46%								
Lane Group Flow (vph)	0	0	0	872	894	0	0	967	0	0	2222	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2			2			2	
Detector Template				Left	Thru			Thru			Thru	
Leading Detector (ft)				20	100			100			100	
Trailing Detector (ft)				0	0			0			0	
Detector 1 Position(ft)				0	0			0			0	
Detector 1 Size(ft)				20	6			6			6	
Detector 1 Type				Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0			0.0			0.0	
Detector 1 Queue (s)				0.0	0.0			0.0			0.0	
Detector 1 Delay (s)				0.0	0.0			0.0			0.0	
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effect Green (s)				49.0	49.0			30.0			30.0	
Actuated g/C Ratio				0.54	0.54			0.33			0.33	
v/c Ratio				0.95	0.97			0.82			1.31	
Control Delay				41.5	44.0			34.5			172.6	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				41.5	44.0			34.5			172.6	
LOS				D	D			C			F	
Approach Delay						42.8		34.5			172.6	
Approach LOS						D		C			F	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.31

Intersection Signal Delay: 99.4

Intersection LOS: F

Intersection Capacity Utilization 93.5%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1485	140	0	0	890	0	0	2040	5
Future Volume (vph)	0	0	0	1485	140	0	0	890	0	0	2040	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1699			3539		5084	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1699			3539		5084	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	1614	152	0	0	967	0	0	2217	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	872	894	0	0	967	0	0	2222	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				49.0	49.0			30.0			30.0	
Effective Green, g (s)				49.0	49.0			30.0			30.0	
Actuated g/C Ratio				0.54	0.54			0.33			0.33	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				915	925			1179			1694	
v/s Ratio Prot				0.52	c0.53			0.27			c0.44	
v/s Ratio Perm												
v/c Ratio				0.95	0.97			0.82			1.31	
Uniform Delay, d1				19.4	19.7			27.5			30.0	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				19.2	21.6			6.4			144.6	
Delay (s)				38.6	41.3			34.0			174.6	
Level of Service				D	D			C			F	
Approach Delay (s)	0.0				40.0			34.0			174.6	
Approach LOS	A				D			C			F	
Intersection Summary												
HCM 2000 Control Delay				99.2				HCM 2000 Level of Service			F	
HCM 2000 Volume to Capacity ratio				1.10								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				93.5%				ICU Level of Service			F	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	200	15	5	10	70	1060	10	10	645	50
Future Volume (vph)	50	10	200	15	5	10	70	1060	10	10	645	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.897			0.999			0.989	
Flt Protected		0.960		0.950			0.950			0.950		
Satd. Flow (prot)	0	1788	1583	1770	1671	0	1770	3536	0	1770	3500	0
Flt Permitted		0.751		0.715			0.360			0.950		
Satd. Flow (perm)	0	1399	1583	1332	1671	0	671	3536	0	1770	3500	0
Right Turn on Red		Yes			Yes				Yes			Yes
Satd. Flow (RTOR)		217			11			1			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1428			412			717			433	
Travel Time (s)		32.5			9.4			16.3			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	217	16	5	11	76	1152	11	11	701	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	217	16	16	0	76	1163	0	11	755	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4			5	2		1	6
Permitted Phases	4		4	4			2					

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Fr <sub>t</sub>	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	3
Permitted Phases	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effect Green (s)	9.6	9.6	9.6	9.6	9.6		69.1	69.1		6.2	53.8	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.77	0.77		0.07	0.60	
v/c Ratio	0.44	0.60	0.11	0.09			0.11	0.43		0.09	0.36	
Control Delay	45.8	12.6	36.2	22.0			4.9	5.2		40.5	11.6	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	45.8	12.6	36.2	22.0			4.9	5.2		40.5	11.6	
LOS	D	B	D	C			A	A		D	B	
Approach Delay	20.2				29.1			5.2			12.0	
Approach LOS	C			C			A				B	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 9.6

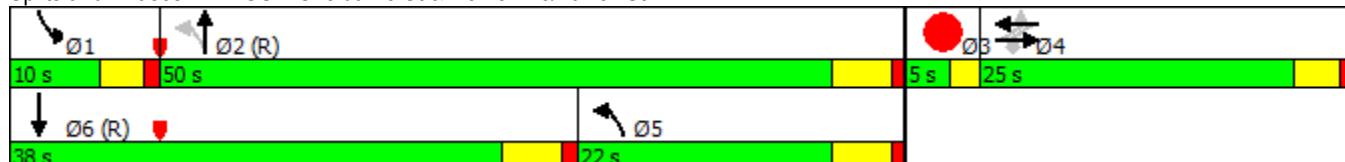
Intersection LOS: A

Intersection Capacity Utilization 53.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	200	15	5	10	70	1060	10	10	645	50
Future Volume (vph)	50	10	200	15	5	10	70	1060	10	10	645	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00			1.00	0.95		1.00	0.95	
Frt	1.00	0.85	1.00	0.90			1.00	1.00		1.00	0.99	
Flt Protected	0.96	1.00	0.95	1.00			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1788	1583	1770	1671			1770	3534		1770	3501	
Flt Permitted	0.75	1.00	0.71	1.00			0.36	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1583	1331	1671			671	3534		1770	3501	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	217	16	5	11	76	1152	11	11	701	54
RTOR Reduction (vph)	0	0	194	0	10	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	65	23	16	6	0	76	1163	0	11	751	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4		2						
Actuated Green, G (s)	9.6	9.6	9.6	9.6			65.9	65.9		1.5	50.6	
Effective Green, g (s)	9.6	9.6	9.6	9.6			65.9	65.9		1.5	50.6	
Actuated g/C Ratio	0.11	0.11	0.11	0.11			0.73	0.73		0.02	0.56	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	149	168	141	178			684	2587		29	1968	
v/s Ratio Prot				0.00			0.02	c0.33		0.01	c0.21	
v/s Ratio Perm	c0.05	0.01	0.01				0.06					
v/c Ratio	0.44	0.14	0.11	0.03			0.11	0.45		0.38	0.38	
Uniform Delay, d1	37.7	36.4	36.4	36.0			3.8	4.8		43.8	11.0	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.4	0.4	0.1			0.1	0.6		8.1	0.6	
Delay (s)	39.7	36.8	36.7	36.1			3.9	5.4		51.9	11.5	
Level of Service	D	D	D	D			A	A		D	B	
Approach Delay (s)	37.5			36.4				5.3			12.1	
Approach LOS	D			D			A				B	
Intersection Summary												
HCM 2000 Control Delay		11.9					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.47										
Actuated Cycle Length (s)		90.0					Sum of lost time (s)			16.0		
Intersection Capacity Utilization		53.7%					ICU Level of Service			A		
Analysis Period (min)		15										
c Critical Lane Group												

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	100	300	0	1523	1514	0	
Future Volume (vph)	100	300	0	1523	1514	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Frt	0.923	0.850					
Flt Protected	0.976						
Satd. Flow (prot)	1678	1504	0	3539	3539	0	
Flt Permitted	0.976						
Satd. Flow (perm)	1678	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	34	212					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	109	326	0	1655	1646	0	
Shared Lane Traffic (%)	35%						
Lane Group Flow (vph)	223	212	0	1655	1646	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1	1		2	2		
Detector Template	Left	Right		Thru	Thru		
Leading Detector (ft)	20	20		100	100		
Trailing Detector (ft)	0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		
Detector 1 Size(ft)	20	20		6	6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type			Cl+Ex	Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0
Total Split (s)	24.0	24.0		82.0	82.0		24.0
Total Split (%)	18.5%	18.5%		63.1%	63.1%		18%
Maximum Green (s)	18.0	18.0		76.0	76.0		22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead					Lag
Lead-Lag Optimize?	Yes	Yes					Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		0.2
Recall Mode	None	None		C-Max	C-Max		None
Walk Time (s)	0.0	0.0		0.0	0.0		5.0
Flash Dont Walk (s)	0.0	0.0		17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0		0	0		0
Act Effect Green (s)	17.0	17.0		101.0	101.0		
Actuated g/C Ratio	0.13	0.13		0.78	0.78		
v/c Ratio	0.90	0.56		0.60	0.60		
Control Delay	83.2	12.5		7.3	7.3		
Queue Delay	0.0	0.0		0.0	6.2		
Total Delay	83.2	12.5		7.3	13.5		
LOS	F	B		A	B		
Approach Delay	48.8			7.3	13.5		
Approach LOS	D			A	B		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 14.8

Intersection LOS: B

Intersection Capacity Utilization 64.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	100	300	0	1523	1514	0
Future Volume (vph)	100	300	0	1523	1514	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	0.92	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	1679	1504		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	1679	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	326	0	1655	1646	0
RTOR Reduction (vph)	30	184	0	0	0	0
Lane Group Flow (vph)	193	28	0	1655	1646	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	17.0	17.0		101.0	101.0	
Effective Green, g (s)	17.0	17.0		101.0	101.0	
Actuated g/C Ratio	0.13	0.13		0.78	0.78	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	219	196		2749	2749	
v/s Ratio Prot	c0.12	0.02		c0.47	0.47	
v/s Ratio Perm						
v/c Ratio	0.88	0.14		0.60	0.60	
Uniform Delay, d1	55.5	50.0		6.1	6.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	30.8	0.1		1.0	1.0	
Delay (s)	86.3	50.2		7.1	7.0	
Level of Service	F	D		A	A	
Approach Delay (s)	68.7			7.1	7.0	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay		14.2		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.65				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		64.2%		ICU Level of Service	C	
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	80	105	40	5	5	135	515	40	5	625	40
Future Volume (vph)	50	80	105	40	5	5	135	515	40	5	625	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			75	0		0	125		0	100	0
Storage Lanes	0			1	0		0	1		0	1	0
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.987			0.989			0.991
Flt Protected				0.981		0.961		0.950			0.950	
Satd. Flow (prot)	0	1827	1583	0	1767	0	1770	1842	0	1770	1846	0
Flt Permitted				0.874		0.516		0.950			0.950	
Satd. Flow (perm)	0	1628	1583	0	949	0	1770	1842	0	1770	1846	0
Right Turn on Red				Yes			Yes			Yes		Yes
Satd. Flow (RTOR)				109		4			4			4
Link Speed (mph)				30		30			30			30
Link Distance (ft)				335		128			357			349
Travel Time (s)				7.6		2.9			8.1			7.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	87	114	43	5	5	147	560	43	5	679	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	141	114	0	53	0	147	603	0	5	722	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)				0		0			12			12
Link Offset(ft)				0		0			0			0
Crosswalk Width(ft)				16		16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)			94		94		94		94			
Detector 2 Size(ft)			6		6		6		6		6	
Detector 2 Type			Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)			0.0			0.0			0.0		0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4		4		8		5	2		1	6
Permitted Phases	4		4	8								

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	15.0	15.0	15.0	15.0	15.0		11.0	20.0		11.0	20.5	
Total Split (s)	18.0	18.0	18.0	18.0	18.0		17.0	60.0		17.0	60.0	
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%		14.2%	50.0%		14.2%	50.0%	
Maximum Green (s)	13.0	13.0	13.0	13.0	13.0		12.0	55.0		12.0	55.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	12.4	12.4		12.4			11.7	70.3		5.9	55.6	
Actuated g/C Ratio	0.13	0.13		0.13			0.12	0.71		0.06	0.56	
v/c Ratio	0.69	0.39		0.43			0.71	0.46		0.05	0.70	
Control Delay	61.7	14.0		52.2			62.8	10.6		49.4	22.2	
Queue Delay	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Delay	61.7	14.0		52.2			62.8	10.6		49.4	22.2	
LOS	E	B		D			E	B		D	C	
Approach Delay	40.4			52.2			20.9			22.4		
Approach LOS		D			D			C			C	

#### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 98.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 25.2

Intersection LOS: C

Intersection Capacity Utilization 64.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: Champlain Pkwy & Home Ave



Lane Group	Ø9
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	21%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	5
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

7: Champlain Pkwy & Home Ave

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	80	105	40	5	5	135	515	40	5	625	40
Future Volume (vph)	50	80	105	40	5	5	135	515	40	5	625	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Frt	1.00	0.85		0.99			1.00	0.99		1.00	0.99	
Flt Protected	0.98	1.00		0.96			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1828	1583		1767			1770	1843		1770	1846	
Flt Permitted	0.87	1.00		0.52			0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1629	1583		949			1770	1843		1770	1846	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	87	114	43	5	5	147	560	43	5	679	43
RTOR Reduction (vph)	0	0	96	0	4	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	141	18	0	49	0	147	602	0	5	720	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	12.4	12.4		12.4			11.7	70.3		1.1	59.7	
Effective Green, g (s)	12.4	12.4		12.4			11.7	70.3		1.1	59.7	
Actuated g/C Ratio	0.12	0.12		0.12			0.11	0.67		0.01	0.57	
Clearance Time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	186		111			196	1229		18	1045	
v/s Ratio Prot					c0.08	0.33			0.00	c0.39		
v/s Ratio Perm	c0.09	0.01		0.05								
v/c Ratio	0.74	0.10		0.45			0.75	0.49		0.28	0.69	
Uniform Delay, d1	44.9	41.5		43.3			45.4	8.7		51.8	16.3	
Progression Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.8	0.2		2.8			14.8	1.4		8.3	3.7	
Delay (s)	58.8	41.7		46.1			60.3	10.1		60.0	20.0	
Level of Service	E	D		D			E	B		E	B	
Approach Delay (s)	51.2			46.1				19.9			20.2	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay	25.3				HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	105.4				Sum of lost time (s)				18.0			
Intersection Capacity Utilization	64.7%				ICU Level of Service				C			
Analysis Period (min)	15											
c Critical Lane Group												

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1310	50	0	0	715	0	0	930	0
Future Volume (vph)	0	0	0	1310	50	0	0	715	0	0	930	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Frt												
Flt Protected					0.950	0.956						
Satd. Flow (prot)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.956						
Satd. Flow (perm)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1424	54	0	0	777	0	0	1011	0
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	740	738	0	0	777	0	0	1011	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2			2			2	
Detector Template				Left	Thru			Thru			Thru	
Leading Detector (ft)				20	100			100			100	
Trailing Detector (ft)				0	0			0			0	
Detector 1 Position(ft)				0	0			0			0	
Detector 1 Size(ft)				20	6			6			6	
Detector 1 Type				Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0			0.0			0.0	
Detector 1 Queue (s)				0.0	0.0			0.0			0.0	
Detector 1 Delay (s)				0.0	0.0			0.0			0.0	
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effect Green (s)				46.5	46.5			32.5			32.5	
Actuated g/C Ratio				0.52	0.52			0.36			0.36	
v/c Ratio				0.85	0.85			0.61			0.55	
Control Delay				29.7	28.9			26.7			24.9	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				29.7	28.9			26.7			24.9	
LOS				C	C			C			C	
Approach Delay					29.3			26.7			24.9	
Approach LOS					C			C			C	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 27.3

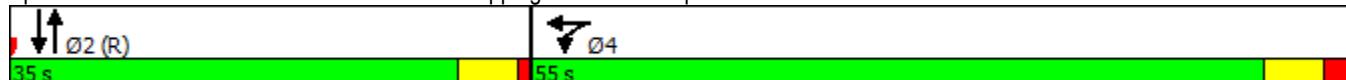
Intersection LOS: C

Intersection Capacity Utilization 71.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

04/23/2020



Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1310	50	0	0	715	0	0	930	0
Future Volume (vph)	0	0	0	1310	50	0	0	715	0	0	930	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1691			3539		5085	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1691			3539		5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1424	54	0	0	777	0	0	1011	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	740	738	0	0	777	0	0	1011	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				46.5	46.5			32.5			32.5	
Effective Green, g (s)				46.5	46.5			32.5			32.5	
Actuated g/C Ratio				0.52	0.52			0.36			0.36	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				868	873			1277			1836	
v/s Ratio Prot				c0.44	0.44			c0.22			0.20	
v/s Ratio Perm												
v/c Ratio				0.85	0.85			0.61			0.55	
Uniform Delay, d1				18.8	18.7			23.5			22.9	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				8.1	7.6			2.2			1.2	
Delay (s)				26.9	26.2			25.7			24.1	
Level of Service				C	C			C			C	
Approach Delay (s)	0.0				26.6			25.7			24.1	
Approach LOS	A				C			C			C	
Intersection Summary												
HCM 2000 Control Delay				25.6				HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio				0.75								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				71.8%				ICU Level of Service			C	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	25	140	30	20	35	160	1285	15	40	910	15
Future Volume (vph)	35	25	140	30	20	35	160	1285	15	40	910	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.905			0.998			0.998	
Flt Protected		0.972		0.950			0.950			0.950		
Satd. Flow (prot)	0	1811	1583	1770	1686	0	1770	3532	0	1770	3532	0
Flt Permitted		0.788		0.715			0.264			0.950		
Satd. Flow (perm)	0	1468	1583	1332	1686	0	492	3532	0	1770	3532	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		158		38			2			2		
Link Speed (mph)		30		30			30			30		
Link Distance (ft)		1428		412			717			433		
Travel Time (s)		32.5		9.4			16.3			9.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	27	152	33	22	38	174	1397	16	43	989	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	152	33	60	0	174	1413	0	43	1005	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16		16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94		94			94			94		
Detector 2 Size(ft)		6		6			6			6		
Detector 2 Type		Cl+Ex		Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)		0.0		0.0			0.0			0.0		
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases	4		4	4			5	2		1	6	
Permitted Phases	4		4	4			2					

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	3
Permitted Phases	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effect Green (s)		9.4	9.4	9.4	9.4		63.9	63.9		7.7	49.6	
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10		0.71	0.71		0.09	0.55	
v/c Ratio	0.42	0.50	0.24	0.29			0.29	0.56		0.28	0.52	
Control Delay	45.4	11.6	39.8	21.3			11.3	9.1		42.7	14.3	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	45.4	11.6	39.8	21.3			11.3	9.1		42.7	14.3	
LOS	D	B	D	C			B	A		D	B	
Approach Delay		21.7					27.9			9.3		15.5
Approach LOS		C					C			A		B

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 13.0

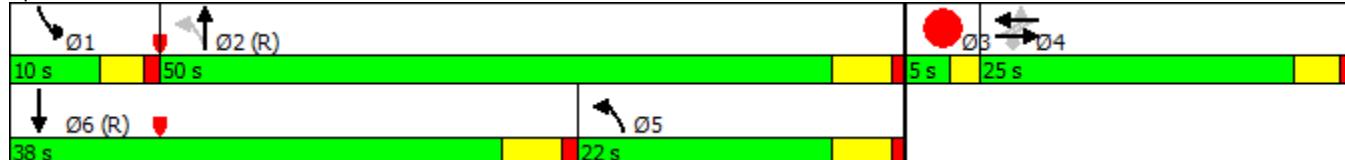
Intersection LOS: B

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

04/23/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	25	140	30	20	35	160	1285	15	40	910	15
Future Volume (vph)	35	25	140	30	20	35	160	1285	15	40	910	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00			1.00	0.95		1.00	0.95	
Frt	1.00	0.85	1.00	0.91			1.00	1.00		1.00	1.00	
Flt Protected	0.97	1.00	0.95	1.00			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1810	1583	1770	1686			1770	3533		1770	3531	
Flt Permitted	0.79	1.00	0.71	1.00			0.26	1.00		0.95	1.00	
Satd. Flow (perm)	1467	1583	1331	1686			493	3533		1770	3531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	27	152	33	22	38	174	1397	16	43	989	16
RTOR Reduction (vph)	0	0	136	0	34	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	65	16	33	26	0	174	1412	0	43	1004	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	9.4	9.4	9.4	9.4			62.3	62.3		5.3	48.0	
Effective Green, g (s)	9.4	9.4	9.4	9.4			62.3	62.3		5.3	48.0	
Actuated g/C Ratio	0.10	0.10	0.10	0.10			0.69	0.69		0.06	0.53	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	153	165	139	176			605	2445		104	1883	
v/s Ratio Prot				0.02			0.06	c0.40		0.02	c0.28	
v/s Ratio Perm	c0.04	0.01	0.02				0.14					
v/c Ratio	0.42	0.10	0.24	0.15			0.29	0.58		0.41	0.53	
Uniform Delay, d1	37.8	36.5	37.0	36.7			7.9	7.1		40.9	13.7	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.3	0.9	0.4			0.3	1.0		2.7	1.1	
Delay (s)	39.7	36.7	37.9	37.0			8.1	8.1		43.5	14.8	
Level of Service	D	D	D	D			A	A		D	B	
Approach Delay (s)	37.6			37.3				8.1			16.0	
Approach LOS	D			D			A				B	

### Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	130	370	0	2055	1747	0	
Future Volume (vph)	130	370	0	2055	1747	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Frt	0.926	0.850					
Flt Protected	0.975						
Satd. Flow (prot)	1682	1504	0	3539	3539	0	
Flt Permitted	0.975						
Satd. Flow (perm)	1682	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	31	255					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	141	402	0	2234	1899	0	
Shared Lane Traffic (%)	34%						
Lane Group Flow (vph)	278	265	0	2234	1899	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1	1		2	2		
Detector Template	Left	Right		Thru	Thru		
Leading Detector (ft)	20	20		100	100		
Trailing Detector (ft)	0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		
Detector 1 Size(ft)	20	20		6	6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type			Cl+Ex	Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0
Total Split (s)	24.0	24.0		82.0	82.0		24.0
Total Split (%)	18.5%	18.5%		63.1%	63.1%		18%
Maximum Green (s)	18.0	18.0		76.0	76.0		22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead					Lag
Lead-Lag Optimize?	Yes	Yes					Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		0.2
Recall Mode	None	None		C-Max	C-Max		None
Walk Time (s)	0.0	0.0		0.0	0.0		5.0
Flash Dont Walk (s)	0.0	0.0		17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0		0	0		0
Act Effect Green (s)	18.0	18.0		100.0	100.0		
Actuated g/C Ratio	0.14	0.14		0.77	0.77		
v/c Ratio	1.07	0.62		0.82	0.70		
Control Delay	123.2	13.9		12.7	9.2		
Queue Delay	0.0	0.0		0.0	23.6		
Total Delay	123.2	13.9		12.7	32.7		
LOS	F	B		B	C		
Approach Delay	69.9			12.7	32.7		
Approach LOS	E			B	C		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 27.5

Intersection LOS: C

Intersection Capacity Utilization 81.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	130	370	0	2055	1747	0
Future Volume (vph)	130	370	0	2055	1747	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	0.93	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	1682	1504		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	1682	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	402	0	2234	1899	0
RTOR Reduction (vph)	27	220	0	0	0	0
Lane Group Flow (vph)	251	45	0	2234	1899	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	18.0	18.0		100.0	100.0	
Effective Green, g (s)	18.0	18.0		100.0	100.0	
Actuated g/C Ratio	0.14	0.14		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	232	208		2722	2722	
v/s Ratio Prot	c0.15	0.03		c0.63	0.54	
v/s Ratio Perm						
v/c Ratio	1.08	0.22		0.82	0.70	
Uniform Delay, d1	56.0	49.7		9.4	7.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	83.0	0.2		2.9	1.5	
Delay (s)	139.0	49.9		12.3	9.0	
Level of Service	F	D		B	A	
Approach Delay (s)	95.5			12.3	9.0	
Approach LOS	F			B	A	
Intersection Summary						
HCM 2000 Control Delay		20.6		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		0.87				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		81.6%		ICU Level of Service	D	
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	25	105	90	50	5	85	400	75	5	975	45
Future Volume (vph)	60	25	105	90	50	5	85	400	75	5	975	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	125		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996			0.976			0.993	
Flt Protected		0.966			0.970		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	1800	0	1770	1818	0	1770	1850	0
Flt Permitted		0.700			0.700		0.950			0.950		
Satd. Flow (perm)	0	1304	1583	0	1299	0	1770	1818	0	1770	1850	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		114			1			10			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		335			128			357			349	
Travel Time (s)		7.6			2.9			8.1			7.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	27	114	98	54	5	92	435	82	5	1060	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	114	0	157	0	92	517	0	5	1109	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4		4	8		5	2		1	6	
Permitted Phases	4		4	8								

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Fr <sub>t</sub>	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	15.0	15.0	15.0	15.0	15.0		11.0	20.0		11.0	20.5	
Total Split (s)	23.0	23.0	23.0	23.0	23.0		13.0	89.0		13.0	89.0	
Total Split (%)	15.3%	15.3%	15.3%	15.3%	15.3%		8.7%	59.3%		8.7%	59.3%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		8.0	84.0		9.0	84.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0			5.0	5.0		4.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	18.1	18.1		18.1			8.0	95.6		6.0	84.4	
Actuated g/C Ratio	0.14	0.14		0.14			0.06	0.74		0.05	0.65	
v/c Ratio	0.51	0.36		0.87			0.84	0.39		0.06	0.92	
Control Delay	64.6	12.8		94.5			111.9	9.3		64.8	34.4	
Queue Delay	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Delay	64.6	12.8		94.5			111.9	9.3		64.8	34.4	
LOS	E	B		F			F	A		E	C	
Approach Delay	36.0			94.5				24.8			34.6	
Approach LOS	D			F				C			C	

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 130

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 36.4

Intersection LOS: D

Intersection Capacity Utilization 85.8%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 7: Champlain Pkwy & Home Ave



Lane Group	Ø9
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	17%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	5
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

7: Champlain Pkwy & Home Ave

04/23/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	25	105	90	50	5	85	400	75	5	975	45
Future Volume (vph)	60	25	105	90	50	5	85	400	75	5	975	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0		5.0	5.0		4.0	5.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00		1.00	0.98		1.00	0.99	
Flt Protected		0.97	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1799	1583		1799		1770	1818		1770	1850	
Flt Permitted		0.70	1.00		0.70		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1304	1583		1299		1770	1818		1770	1850	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	27	114	98	54	5	92	435	82	5	1060	49
RTOR Reduction (vph)	0	0	99	0	1	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	92	15	0	156	0	92	514	0	5	1108	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	18.1	18.1		18.1		8.0	95.6		1.2	87.8		
Effective Green, g (s)	18.1	18.1		18.1		8.0	95.6		1.2	87.8		
Actuated g/C Ratio	0.13	0.13		0.13		0.06	0.70		0.01	0.65		
Clearance Time (s)	5.0	5.0		5.0		5.0	5.0		4.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	173	211		173		104	1280		15	1196		
v/s Ratio Prot					c0.05	0.28			0.00	c0.60		
v/s Ratio Perm	0.07	0.01		c0.12								
v/c Ratio	0.53	0.07		0.90		0.88	0.40		0.33	0.93		
Uniform Delay, d1	54.8	51.5		57.9		63.4	8.3		66.9	21.1		
Progression Factor	1.00	1.00		1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	3.1	0.1		41.6		53.0	0.9		12.7	13.5		
Delay (s)	58.0	51.6		99.5		116.4	9.2		79.5	34.6		
Level of Service	E	D		F		F	A		E	C		
Approach Delay (s)	54.4			99.5			25.4			34.8		
Approach LOS		D			F		C			C		

## Intersection Summary

HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	135.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1320	135	0	0	810	0	0	1380	5
Future Volume (vph)	0	0	0	1320	135	0	0	810	0	0	1380	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt												
Flt Protected					0.950	0.961						
Satd. Flow (prot)	0	0	0	1681	1701	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.961						
Satd. Flow (perm)	0	0	0	1681	1701	0	0	3539	0	0	5085	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												1
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1435	147	0	0	880	0	0	1500	5
Shared Lane Traffic (%)				45%								
Lane Group Flow (vph)	0	0	0	789	793	0	0	880	0	0	1505	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2			2			2	
Detector Template				Left	Thru			Thru			Thru	
Leading Detector (ft)				20	100			100			100	
Trailing Detector (ft)				0	0			0			0	
Detector 1 Position(ft)				0	0			0			0	
Detector 1 Size(ft)				20	6			6			6	
Detector 1 Type				Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0			0.0			0.0	
Detector 1 Queue (s)				0.0	0.0			0.0			0.0	
Detector 1 Delay (s)				0.0	0.0			0.0			0.0	
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effect Green (s)				47.6	47.6			31.4			31.4	
Actuated g/C Ratio				0.53	0.53			0.35			0.35	
v/c Ratio				0.89	0.88			0.71			0.85	
Control Delay				32.5	31.7			29.8			33.3	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				32.5	31.7			29.8			33.3	
LOS				C	C			C			C	
Approach Delay						32.1		29.8			33.3	
Approach LOS						C		C			C	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 32.0

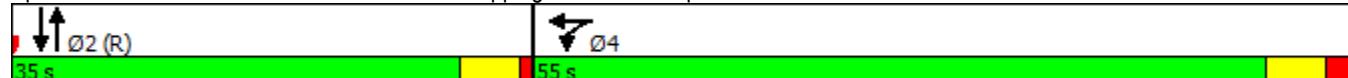
Intersection LOS: C

Intersection Capacity Utilization 76.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

04/23/2020



Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1320	135	0	0	810	0	0	1380	5
Future Volume (vph)	0	0	0	1320	135	0	0	810	0	0	1380	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1700			3539		5083	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1700			3539		5083	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1435	147	0	0	880	0	0	1500	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	789	793	0	0	880	0	0	1504	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				47.6	47.6			31.4			31.4	
Effective Green, g (s)				47.6	47.6			31.4			31.4	
Actuated g/C Ratio				0.53	0.53			0.35			0.35	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				889	899			1234			1773	
v/s Ratio Prot				c0.47	0.47			0.25			c0.30	
v/s Ratio Perm												
v/c Ratio				0.89	0.88			0.71			0.85	
Uniform Delay, d1				18.8	18.7			25.4			27.1	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				10.7	10.2			3.5			5.3	
Delay (s)				29.5	28.9			28.9			32.4	
Level of Service				C	C			C			C	
Approach Delay (s)	0.0				29.2			28.9			32.4	
Approach LOS	A				C			C			C	
Intersection Summary												
HCM 2000 Control Delay				30.3				HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio				0.87								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				76.1%				ICU Level of Service			D	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	220	15	5	10	75	1050	10	10	735	50
Future Volume (vph)	50	10	220	15	5	10	75	1050	10	10	735	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.897			0.999			0.991	
Flt Protected		0.960		0.950			0.950			0.950		
Satd. Flow (prot)	0	1788	1583	1770	1671	0	1770	3536	0	1770	3507	0
Flt Permitted		0.751		0.715			0.314			0.950		
Satd. Flow (perm)	0	1399	1583	1332	1671	0	585	3536	0	1770	3507	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		239			11			1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1428			412			717			433	
Travel Time (s)		32.5			9.4			16.3			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	239	16	5	11	82	1141	11	11	799	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	239	16	16	0	82	1152	0	11	853	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4			5	2		1	6
Permitted Phases	4		4	4			2					

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Fr <sub>t</sub>	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	3
Permitted Phases	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effect Green (s)		9.7	9.7	9.7	9.7		69.1	69.1		6.2	53.7	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.77	0.77		0.07	0.60	
v/c Ratio	0.43	0.62	0.11	0.08			0.13	0.42		0.09	0.41	
Control Delay	45.5	12.7	36.0	21.8			5.3	5.2		40.5	12.2	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	45.5	12.7	36.0	21.8			5.3	5.2		40.5	12.2	
LOS	D	B	D	C			A	A		D	B	
Approach Delay	19.7				28.9			5.2			12.5	
Approach LOS	B			C			A				B	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 9.9

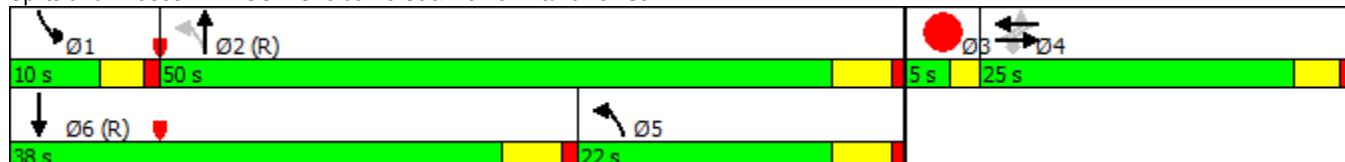
Intersection LOS: A

Intersection Capacity Utilization 53.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	220	15	5	10	75	1050	10	10	735	50
Future Volume (vph)	50	10	220	15	5	10	75	1050	10	10	735	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00			1.00	0.95		1.00	0.95	
Frt	1.00	0.85	1.00	0.90			1.00	1.00		1.00	0.99	
Flt Protected	0.96	1.00	0.95	1.00			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1788	1583	1770	1671			1770	3534		1770	3506	
Flt Permitted	0.75	1.00	0.71	1.00			0.31	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1583	1331	1671			585	3534		1770	3506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	239	16	5	11	82	1141	11	11	799	54
RTOR Reduction (vph)	0	0	213	0	10	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	65	26	16	6	0	82	1152	0	11	849	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	9.7	9.7	9.7	9.7			65.8	65.8		1.5	50.4	
Effective Green, g (s)	9.7	9.7	9.7	9.7			65.8	65.8		1.5	50.4	
Actuated g/C Ratio	0.11	0.11	0.11	0.11			0.73	0.73		0.02	0.56	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	150	170	143	180			637	2583		29	1963	
v/s Ratio Prot				0.00			0.02	c0.33		0.01	c0.24	
v/s Ratio Perm	c0.05	0.02	0.01				0.07					
v/c Ratio	0.43	0.15	0.11	0.03			0.13	0.45		0.38	0.43	
Uniform Delay, d1	37.6	36.4	36.3	36.0			4.6	4.8		43.8	11.5	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.4	0.3	0.1			0.1	0.6		8.1	0.7	
Delay (s)	39.6	36.8	36.6	36.0			4.7	5.4		51.9	12.2	
Level of Service	D	D	D	D			A	A		D	B	
Approach Delay (s)	37.4			36.3				5.3			12.7	
Approach LOS	D			D			A				B	
Intersection Summary												
HCM 2000 Control Delay		12.4					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.47										
Actuated Cycle Length (s)		90.0					Sum of lost time (s)			16.0		
Intersection Capacity Utilization		53.5%					ICU Level of Service			A		
Analysis Period (min)		15										
c Critical Lane Group												

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	105	310	0	1596	1586	0	
Future Volume (vph)	105	310	0	1596	1586	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Frt	0.924	0.850					
Flt Protected	0.976						
Satd. Flow (prot)	1680	1504	0	3539	3539	0	
Flt Permitted	0.976						
Satd. Flow (perm)	1680	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	33	219					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	114	337	0	1735	1724	0	
Shared Lane Traffic (%)	35%						
Lane Group Flow (vph)	232	219	0	1735	1724	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1	1		2	2		
Detector Template	Left	Right		Thru	Thru		
Leading Detector (ft)	20	20		100	100		
Trailing Detector (ft)	0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		
Detector 1 Size(ft)	20	20		6	6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type			Cl+Ex	Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0
Total Split (s)	24.0	24.0		82.0	82.0		24.0
Total Split (%)	18.5%	18.5%		63.1%	63.1%		18%
Maximum Green (s)	18.0	18.0		76.0	76.0		22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead					Lag
Lead-Lag Optimize?	Yes	Yes					Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		0.2
Recall Mode	None	None		C-Max	C-Max		None
Walk Time (s)	0.0	0.0		0.0	0.0		5.0
Flash Dont Walk (s)	0.0	0.0		17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0		0	0		0
Act Effect Green (s)	17.2	17.2		100.8	100.8		
Actuated g/C Ratio	0.13	0.13		0.78	0.78		
v/c Ratio	0.92	0.56		0.63	0.63		
Control Delay	87.7	12.5		7.8	7.8		
Queue Delay	0.0	0.0		0.0	9.3		
Total Delay	87.7	12.5		7.8	17.1		
LOS	F	B		A	B		
Approach Delay	51.1			7.8	17.1		
Approach LOS	D			A	B		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 16.9

Intersection LOS: B

Intersection Capacity Utilization 66.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	105	310	0	1596	1586	0
Future Volume (vph)	105	310	0	1596	1586	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	0.92	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	1679	1504		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	1679	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	337	0	1735	1724	0
RTOR Reduction (vph)	29	190	0	0	0	0
Lane Group Flow (vph)	203	29	0	1735	1724	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	17.2	17.2		100.8	100.8	
Effective Green, g (s)	17.2	17.2		100.8	100.8	
Actuated g/C Ratio	0.13	0.13		0.78	0.78	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	222	198		2744	2744	
v/s Ratio Prot	c0.12	0.02		c0.49	0.49	
v/s Ratio Perm						
v/c Ratio	0.92	0.15		0.63	0.63	
Uniform Delay, d1	55.7	49.9		6.4	6.4	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	37.3	0.1		1.1	1.1	
Delay (s)	93.0	50.0		7.6	7.5	
Level of Service	F	D		A	A	
Approach Delay (s)	72.1			7.6	7.5	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay		15.0		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.69				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		66.6%		ICU Level of Service	C	
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	85	115	50	5	5	160	530	40	5	655	50
Future Volume (vph)	60	85	115	50	5	5	160	530	40	5	655	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			75	0		0	125		0	100	0
Storage Lanes	0			1	0		0	1		0	1	0
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>				0.850		0.989			0.990			0.989
Flt Protected				0.980		0.960		0.950			0.950	
Satd. Flow (prot)	0	1825	1583	0	1769	0	1770	1844	0	1770	1842	0
Flt Permitted				0.862		0.456		0.950			0.950	
Satd. Flow (perm)	0	1606	1583	0	840	0	1770	1844	0	1770	1842	0
Right Turn on Red				Yes			Yes			Yes		Yes
Satd. Flow (RTOR)				107		3		4			4	
Link Speed (mph)				30		30		30			30	
Link Distance (ft)				335		128		357			349	
Travel Time (s)				7.6		2.9		8.1			7.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	92	125	54	5	5	174	576	43	5	712	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	157	125	0	64	0	174	619	0	5	766	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)				0		0		12			12	
Link Offset(ft)				0		0		0			0	
Crosswalk Width(ft)				16		16		16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4		4	8		5	2		1	6	
Permitted Phases	4		4	8								

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Fr <sub>t</sub>	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	15.0	15.0	15.0	15.0	15.0		11.0	20.0		11.0	20.5	
Total Split (s)	18.0	18.0	18.0	18.0	18.0		18.0	59.0		18.0	59.0	
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%		15.0%	49.2%		15.0%	49.2%	
Maximum Green (s)	13.0	13.0	13.0	13.0	13.0		13.0	54.0		13.0	54.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	12.9	12.9		12.9			13.0	70.6		5.9	54.5	
Actuated g/C Ratio	0.13	0.13		0.13			0.13	0.71		0.06	0.55	
v/c Ratio	0.75	0.42		0.58			0.76	0.47		0.05	0.76	
Control Delay	66.6	16.6		63.2			64.6	10.9		49.4	25.4	
Queue Delay	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Delay	66.6	16.6		63.2			64.6	10.9		49.4	25.4	
LOS	E	B		E			E	B		D	C	
Approach Delay	44.5			63.2				22.7			25.6	
Approach LOS	D			E			C			C		

#### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 99.7

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 28.4

Intersection LOS: C

Intersection Capacity Utilization 68.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: Champlain Pkwy & Home Ave



Lane Group	Ø9
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	21%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	5
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

7: Champlain Pkwy & Home Ave

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	85	115	50	5	5	160	530	40	5	655	50
Future Volume (vph)	60	85	115	50	5	5	160	530	40	5	655	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Frt	1.00	0.85		0.99			1.00	0.99		1.00	0.99	
Flt Protected	0.98	1.00		0.96			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1583		1768			1770	1843		1770	1843	
Flt Permitted	0.86	1.00		0.46			0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1605	1583		841			1770	1843		1770	1843	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	92	125	54	5	5	174	576	43	5	712	54
RTOR Reduction (vph)	0	0	94	0	3	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	157	31	0	61	0	174	618	0	5	764	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4				8		5	2		1	6
Permitted Phases	4		4		8							
Actuated Green, G (s)	12.9	12.9		12.9			13.0	70.5		1.1	58.6	
Effective Green, g (s)	12.9	12.9		12.9			13.0	70.5		1.1	58.6	
Actuated g/C Ratio	0.12	0.12		0.12			0.12	0.66		0.01	0.55	
Clearance Time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	194	192		102			216	1223		18	1016	
v/s Ratio Prot					c0.10	0.34				0.00	c0.41	
v/s Ratio Perm	c0.10	0.02		0.07								
v/c Ratio	0.81	0.16		0.60			0.81	0.51		0.28	0.75	
Uniform Delay, d1	45.5	41.8		44.2			45.4	9.0		52.2	18.2	
Progression Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.4	0.4		9.6			19.2	1.5		8.3	5.1	
Delay (s)	66.9	42.2		53.8			64.6	10.5		60.4	23.4	
Level of Service	E	D		D			E	B		E	C	
Approach Delay (s)	55.9			53.8			22.4				23.6	
Approach LOS	E			D			C				C	
Intersection Summary												
HCM 2000 Control Delay	28.9				HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	106.2				Sum of lost time (s)					18.0		
Intersection Capacity Utilization	68.9%				ICU Level of Service					C		
Analysis Period (min)	15											
c Critical Lane Group												

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1285	50	0	0	780	0	0	1045	0
Future Volume (vph)	0	0	0	1285	50	0	0	780	0	0	1045	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Frt												
Flt Protected					0.950	0.956						
Satd. Flow (prot)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.956						
Satd. Flow (perm)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1397	54	0	0	848	0	0	1136	0
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	726	725	0	0	848	0	0	1136	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2			2			2	
Detector Template				Left	Thru			Thru			Thru	
Leading Detector (ft)				20	100			100			100	
Trailing Detector (ft)				0	0			0			0	
Detector 1 Position(ft)				0	0			0			0	
Detector 1 Size(ft)				20	6			6			6	
Detector 1 Type				Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0			0.0			0.0	
Detector 1 Queue (s)				0.0	0.0			0.0			0.0	
Detector 1 Delay (s)				0.0	0.0			0.0			0.0	
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effect Green (s)				46.2	46.2			32.8			32.8	
Actuated g/C Ratio				0.51	0.51			0.36			0.36	
v/c Ratio				0.84	0.84			0.66			0.61	
Control Delay				28.8	28.2			27.7			25.8	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				28.8	28.2			27.7			25.8	
LOS				C	C			C			C	
Approach Delay					28.5			27.7			25.8	
Approach LOS					C			C			C	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 27.4

Intersection LOS: C

Intersection Capacity Utilization 71.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

04/23/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1285	50	0	0	780	0	0	1045	0
Future Volume (vph)	0	0	0	1285	50	0	0	780	0	0	1045	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1691			3539		5085	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1691			3539		5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1397	54	0	0	848	0	0	1136	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	726	725	0	0	848	0	0	1136	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				46.2	46.2			32.8			32.8	
Effective Green, g (s)				46.2	46.2			32.8			32.8	
Actuated g/C Ratio				0.51	0.51			0.36			0.36	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				862	868			1289			1853	
v/s Ratio Prot				c0.43	0.43			c0.24			0.22	
v/s Ratio Perm												
v/c Ratio				0.84	0.84			0.66			0.61	
Uniform Delay, d1				18.8	18.7			23.9			23.4	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				7.5	7.0			2.6			1.5	
Delay (s)				26.3	25.7			26.5			24.9	
Level of Service				C	C			C			C	
Approach Delay (s)	0.0				26.0			26.5			24.9	
Approach LOS	A				C			C			C	
Intersection Summary												
HCM 2000 Control Delay				25.8				HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio				0.77								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				71.1%				ICU Level of Service			C	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	25	375	30	20	35	355	1480	15	45	1325	20
Future Volume (vph)	40	25	375	30	20	35	355	1480	15	45	1325	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.905			0.999			0.998	
Flt Protected		0.970		0.950			0.950			0.950		
Satd. Flow (prot)	0	1807	1583	1770	1686	0	1770	3536	0	1770	3532	0
Flt Permitted		0.791		0.711			0.099			0.950		
Satd. Flow (perm)	0	1473	1583	1324	1686	0	184	3536	0	1770	3532	0
Right Turn on Red		Yes			Yes				Yes			Yes
Satd. Flow (RTOR)		408		38			2			2		
Link Speed (mph)		30		30			30			30		
Link Distance (ft)		1428		412			717			433		
Travel Time (s)		32.5		9.4			16.3			9.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	27	408	33	22	38	386	1609	16	49	1440	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	408	33	60	0	386	1625	0	49	1462	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases	4		4	4			5	2		1	6	
Permitted Phases	4		4	4			2					

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Fr <sub>t</sub>	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	3
Permitted Phases	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effect Green (s)	11.6	11.6	11.6	11.6	11.6		61.5	61.5		7.9	47.4	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.68	0.68		0.09	0.53	
v/c Ratio	0.37	0.73	0.19	0.24			0.91	0.67		0.31	0.79	
Control Delay	39.1	11.8	34.7	18.1			56.5	13.4		43.1	22.7	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	39.1	11.8	34.7	18.1			56.5	13.4		43.1	22.7	
LOS	D	B	C	B			E	B		D	C	
Approach Delay	15.8				24.0			21.6			23.4	
Approach LOS	B				C			C			C	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 21.6

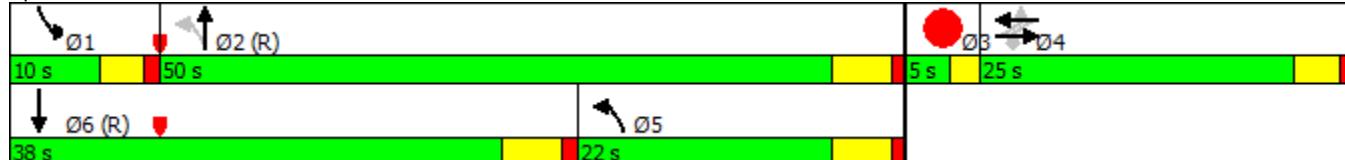
Intersection LOS: C

Intersection Capacity Utilization 78.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	25	375	30	20	35	355	1480	15	45	1325	20
Future Volume (vph)	40	25	375	30	20	35	355	1480	15	45	1325	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95		
Frt	1.00	0.85	1.00	0.91			1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.97	1.00	0.95	1.00			0.95	1.00	0.95	1.00		
Satd. Flow (prot)	1807	1583	1770	1686			1770	3534	1770	3531		
Flt Permitted	0.79	1.00	0.71	1.00			0.10	1.00	0.95	1.00		
Satd. Flow (perm)	1474	1583	1325	1686			185	3534	1770	3531		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	43	27	408	33	22	38	386	1609	16	49	1440	22
RTOR Reduction (vph)	0	0	355	0	33	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	70	53	33	27	0	386	1624	0	49	1461	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	11.6	11.6	11.6	11.6	11.6		59.9	59.9		5.5	45.8	
Effective Green, g (s)	11.6	11.6	11.6	11.6	11.6		59.9	59.9		5.5	45.8	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.67	0.67		0.06	0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	189	204	170	217			450	2352		108	1796	
v/s Ratio Prot				0.02			c0.18	0.46		0.03	c0.41	
v/s Ratio Perm	c0.05	0.03	0.02				c0.39					
v/c Ratio	0.37	0.26	0.19	0.12			0.86	0.69		0.45	0.81	
Uniform Delay, d1	35.9	35.3	35.0	34.7			23.5	9.3		40.8	18.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.7	0.6	0.3			14.9	1.7		3.0	4.2	
Delay (s)	37.1	36.0	35.6	35.0			38.4	11.0		43.8	22.7	
Level of Service	D	D	D	C			D	B		D	C	
Approach Delay (s)	36.2			35.2				16.3			23.4	
Approach LOS	D			D			B			C		
Intersection Summary												
HCM 2000 Control Delay		21.6					HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio		0.80										
Actuated Cycle Length (s)		90.0					Sum of lost time (s)			16.0		
Intersection Capacity Utilization		78.8%					ICU Level of Service			D		
Analysis Period (min)		15										
c Critical Lane Group												

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	297	9	0	2386	2029	0	
Future Volume (vph)	297	9	0	2386	2029	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Frt			0.850				
Flt Protected			0.953				
Satd. Flow (prot)	1775	1504	0	3539	3539	0	
Flt Permitted			0.953				
Satd. Flow (perm)	1775	1504	0	3539	3539	0	
Right Turn on Red			Yes			Yes	
Satd. Flow (RTOR)			9				
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	323	10	0	2593	2205	0	
Shared Lane Traffic (%)			10%				
Lane Group Flow (vph)	324	9	0	2593	2205	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1	1		2	2		
Detector Template	Left	Right		Thru	Thru		
Leading Detector (ft)	20	20		100	100		
Trailing Detector (ft)	0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		
Detector 1 Size(ft)	20	20		6	6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type				Cl+Ex	Cl+Ex		
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2		3
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0		1.0

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0
Total Split (s)	24.0	24.0		82.0	82.0		24.0
Total Split (%)	18.5%	18.5%		63.1%	63.1%		18%
Maximum Green (s)	18.0	18.0		76.0	76.0		22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead					Lag
Lead-Lag Optimize?	Yes	Yes					Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		0.2
Recall Mode	None	None		C-Max	C-Max		None
Walk Time (s)	0.0	0.0		0.0	0.0		5.0
Flash Dont Walk (s)	0.0	0.0		17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0		0	0		0
Act Effect Green (s)	18.0	18.0		100.0	100.0		
Actuated g/C Ratio	0.14	0.14		0.77	0.77		
v/c Ratio	1.32	0.04		0.95	0.81		
Control Delay	213.7	24.8		23.0	12.3		
Queue Delay	0.0	0.0		0.0	46.1		
Total Delay	213.7	24.8		23.0	58.5		
LOS	F	C		C	E		
Approach Delay	208.6			23.0	58.5		
Approach LOS	F			C	E		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.32

Intersection Signal Delay: 50.3

Intersection LOS: D

Intersection Capacity Utilization 152.0%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	297	9	0	2386	2029	0
Future Volume (vph)	297	9	0	2386	2029	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1773	1504		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1773	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	323	10	0	2593	2205	0
RTOR Reduction (vph)	0	8	0	0	0	0
Lane Group Flow (vph)	324	1	0	2593	2205	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	18.0	18.0		100.0	100.0	
Effective Green, g (s)	18.0	18.0		100.0	100.0	
Actuated g/C Ratio	0.14	0.14		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	245	208		2722	2722	
v/s Ratio Prot	c0.18	0.00		c0.73	0.62	
v/s Ratio Perm						
v/c Ratio	1.32	0.01		0.95	0.81	
Uniform Delay, d1	56.0	48.3		13.0	9.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	170.7	0.0		9.3	2.7	
Delay (s)	226.7	48.3		22.2	11.9	
Level of Service	F	D		C	B	
Approach Delay (s)	221.9			22.2	11.9	
Approach LOS	F			C	B	
Intersection Summary						
HCM 2000 Control Delay		30.8		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		1.03				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		152.0%		ICU Level of Service	H	
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	20	130	95	50	5	105	395	85	5	965	55
Future Volume (vph)	80	20	130	95	50	5	105	395	85	5	965	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	125		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>			0.850		0.996			0.974			0.992	
Flt Protected		0.962			0.969		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1798	0	1770	1814	0	1770	1848	0
Flt Permitted		0.679			0.643		0.950			0.950		
Satd. Flow (perm)	0	1265	1583	0	1193	0	1770	1814	0	1770	1848	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		141			1			11			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		335			128			357			349	
Travel Time (s)		7.6			2.9			8.1			7.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	22	141	103	54	5	114	429	92	5	1049	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	109	141	0	162	0	114	521	0	5	1109	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4		4	8		5	2		1	6	
Permitted Phases	4		4	8								

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	15.0	15.0	15.0	15.0	15.0		11.0	20.0		11.0	20.5	
Total Split (s)	24.0	24.0	24.0	24.0	24.0		14.0	87.0		14.0	87.0	
Total Split (%)	16.0%	16.0%	16.0%	16.0%	16.0%		9.3%	58.0%		9.3%	58.0%	
Maximum Green (s)	19.0	19.0	19.0	19.0	19.0		9.0	82.0		9.0	82.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	19.1	19.1		19.1			9.0	94.4		6.0	82.4	
Actuated g/C Ratio	0.15	0.15		0.15			0.07	0.73		0.05	0.63	
v/c Ratio	0.59	0.40		0.92			0.93	0.39		0.06	0.95	
Control Delay	67.1	12.0		104.6			123.9	10.0		64.8	39.2	
Queue Delay	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Delay	67.1	12.0		104.6			123.9	10.0		64.8	39.2	
LOS	E	B		F			F	A		E	D	
Approach Delay	36.0			104.6				30.4			39.3	
Approach LOS		D			F			C			D	

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 130

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 41.2

Intersection LOS: D

Intersection Capacity Utilization 87.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 7: Champlain Pkwy & Home Ave



Lane Group	Ø9
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	17%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	5
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

7: Champlain Pkwy & Home Ave

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	20	130	95	50	5	105	395	85	5	965	55
Future Volume (vph)	80	20	130	95	50	5	105	395	85	5	965	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00			1.00	0.97		1.00	0.99	
Flt Protected	0.96	1.00		0.97			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1791	1583		1798			1770	1813		1770	1848	
Flt Permitted	0.68	1.00		0.64			0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1265	1583		1193			1770	1813		1770	1848	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	22	141	103	54	5	114	429	92	5	1049	60
RTOR Reduction (vph)	0	0	121	0	1	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	109	20	0	161	0	114	518	0	5	1108	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	19.1	19.1		19.1			9.0	94.4		1.2	86.6	
Effective Green, g (s)	19.1	19.1		19.1			9.0	94.4		1.2	86.6	
Actuated g/C Ratio	0.14	0.14		0.14			0.07	0.69		0.01	0.63	
Clearance Time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	177	221		166			116	1253		15	1172	
v/s Ratio Prot					c0.06	0.29			0.00	c0.60		
v/s Ratio Perm	0.09	0.01		c0.14								
v/c Ratio	0.62	0.09		0.97			0.98	0.41		0.33	0.95	
Uniform Delay, d1	55.2	51.1		58.4			63.7	9.1		67.3	22.8	
Progression Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.2	0.2		60.9			77.7	1.0		12.7	16.1	
Delay (s)	61.5	51.3		119.3			141.4	10.1		79.9	38.9	
Level of Service	E	D		F			F	B		E	D	
Approach Delay (s)	55.7			119.3				33.7			39.0	
Approach LOS	E			F			C				D	
Intersection Summary												
HCM 2000 Control Delay	45.4				HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	136.5				Sum of lost time (s)				18.0			
Intersection Capacity Utilization	87.3%				ICU Level of Service				E			
Analysis Period (min)	15											
c Critical Lane Group												

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1485	140	1035	0	890	0	0	2040	5
Future Volume (vph)	0	0	0	1485	140	1035	0	890	0	0	2040	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt						0.883						
Flt Protected					0.950	0.994						
Satd. Flow (prot)	0	0	0	1681	1553	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.994						
Satd. Flow (perm)	0	0	0	1681	1553	0	0	3539	0	0	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					21							
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1614	152	1125	0	967	0	0	2217	5
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	1453	1438	0	0	967	0	0	2222	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2			2			2	
Detector Template				Left	Thru			Thru			Thru	
Leading Detector (ft)				20	100			100			100	
Trailing Detector (ft)				0	0			0			0	
Detector 1 Position(ft)				0	0			0			0	
Detector 1 Size(ft)				20	6			6			6	
Detector 1 Type				Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0			0.0			0.0	
Detector 1 Queue (s)				0.0	0.0			0.0			0.0	
Detector 1 Delay (s)				0.0	0.0			0.0			0.0	
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effect Green (s)				49.0	49.0			30.0			30.0	
Actuated g/C Ratio				0.54	0.54			0.33			0.33	
v/c Ratio				1.59	1.68			0.82			1.31	
Control Delay				291.9	333.5			34.5			172.6	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				291.9	333.5			34.5			172.6	
LOS				F	F			C			F	
Approach Delay						312.6		34.5			172.6	
Approach LOS						F		C			F	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.68

Intersection Signal Delay: 217.2

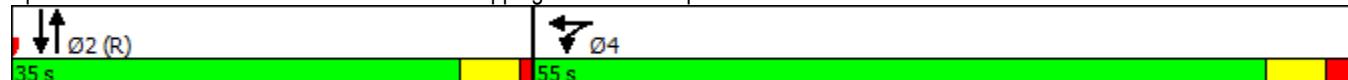
Intersection LOS: F

Intersection Capacity Utilization 125.2%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

04/23/2020



Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1485	140	1035	0	890	0	0	2040	5
Future Volume (vph)	0	0	0	1485	140	1035	0	890	0	0	2040	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	0.88			1.00		1.00	
Flt Protected					0.95	0.99			1.00		1.00	
Satd. Flow (prot)					1681	1553			3539		5084	
Flt Permitted					0.95	0.99			1.00		1.00	
Satd. Flow (perm)					1681	1553			3539		5084	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	1614	152	1125	0	967	0	0	2217	5
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	1453	1428	0	0	967	0	0	2222	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				49.0	49.0			30.0			30.0	
Effective Green, g (s)				49.0	49.0			30.0			30.0	
Actuated g/C Ratio				0.54	0.54			0.33			0.33	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				915	845			1179			1694	
v/s Ratio Prot				0.86	c0.92			0.27			c0.44	
v/s Ratio Perm												
v/c Ratio				1.59	1.69			0.82			1.31	
Uniform Delay, d1				20.5	20.5			27.5			30.0	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				269.8	315.8			6.4			144.6	
Delay (s)				290.3	336.3			34.0			174.6	
Level of Service				F	F			C			F	
Approach Delay (s)	0.0				313.2			34.0			174.6	
Approach LOS	A				F			C			F	
Intersection Summary												
HCM 2000 Control Delay				218.1				HCM 2000 Level of Service			F	
HCM 2000 Volume to Capacity ratio				1.55								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				125.2%				ICU Level of Service			H	
Analysis Period (min)				15								
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Volume (veh/h)	195	30	110	70	10	40
Future Volume (Veh/h)	195	30	110	70	10	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	212	33	120	76	11	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		245		544	228	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		245		544	228	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		91		98	95	
cM capacity (veh/h)		1321		454	811	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	245	196	54			
Volume Left	0	120	11			
Volume Right	33	0	43			
cSH	1700	1321	699			
Volume to Capacity	0.14	0.09	0.08			
Queue Length 95th (ft)	0	7	6			
Control Delay (s)	0.0	5.2	10.6			
Lane LOS		A	B			
Approach Delay (s)	0.0	5.2	10.6			
Approach LOS		B				
Intersection Summary						
Average Delay		3.2				
Intersection Capacity Utilization		35.2%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	65	145	25	40	140	245	10	160	20	150	250	45
Future Volume (vph)	65	145	25	40	140	245	10	160	20	150	250	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	158	27	43	152	266	11	174	22	163	272	49
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	256	461	207	484								
Volume Left (vph)	71	43	11	163								
Volume Right (vph)	27	266	22	49								
Hadj (s)	0.03	-0.29	-0.02	0.04								
Departure Headway (s)	8.3	7.3	8.5	7.5								
Degree Utilization, x	0.59	0.93	0.49	1.01								
Capacity (veh/h)	420	498	404	479								
Control Delay (s)	22.5	52.7	19.3	70.3								
Approach Delay (s)	22.5	52.7	19.3	70.3								
Approach LOS	C	F	C	F								
Intersection Summary												
Delay												48.3
Level of Service												E
Intersection Capacity Utilization					71.6%		ICU Level of Service					C
Analysis Period (min)												15

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	25	1594	1514	178
Future Volume (Veh/h)	0	0	25	1594	1514	178
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	27	1733	1646	193
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.78	0.69	0.69			
vC, conflicting volume	2566	823	1839			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1432	0	1314			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	92			
cM capacity (veh/h)	90	747	360			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	27	866	866	823	823	193
Volume Left	27	0	0	0	0	0
Volume Right	0	0	0	0	0	193
cSH	360	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.51	0.51	0.48	0.48	0.11
Queue Length 95th (ft)	6	0	0	0	0	0
Control Delay (s)	15.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.2			0.0		
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		57.7%		ICU Level of Service		B
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑→	↓	↖	↙	↗	↘
Traffic Volume (veh/h)	195	30	110	70	10	40
Future Volume (Veh/h)	195	30	110	70	10	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	212	33	120	76	11	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)			335			
pX, platoon unblocked						
vC, conflicting volume		245		544	228	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		245		544	228	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		91		98	95	
cM capacity (veh/h)		1321		454	811	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	245	196	54			
Volume Left	0	120	11			
Volume Right	33	0	43			
cSH	1700	1321	699			
Volume to Capacity	0.14	0.09	0.08			
Queue Length 95th (ft)	0	7	6			
Control Delay (s)	0.0	5.2	10.6			
Lane LOS		A	B			
Approach Delay (s)	0.0	5.2	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay		3.2				
Intersection Capacity Utilization		35.2%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	20	110	0	10	15	90	5	55	10	100	20	20
Future Volume (vph)	20	110	0	10	15	90	5	55	10	100	20	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	120	0	11	16	98	5	60	11	109	22	22
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	142	125	76	153								
Volume Left (vph)	22	11	5	109								
Volume Right (vph)	0	98	11	22								
Hadj (s)	0.06	-0.42	-0.04	0.09								
Departure Headway (s)	4.7	4.2	4.7	4.7								
Degree Utilization, x	0.18	0.15	0.10	0.20								
Capacity (veh/h)	722	794	716	716								
Control Delay (s)	8.7	7.9	8.2	8.9								
Approach Delay (s)	8.7	7.9	8.2	8.9								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					8.5							
Level of Service					A							
Intersection Capacity Utilization				32.2%		ICU Level of Service				A		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	25	1594	1514	178
Future Volume (Veh/h)	0	0	25	1594	1514	178
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	27	1733	1646	193
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.79	0.69	0.69			
vC, conflicting volume	2566	823	1839			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1278	0	1314			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	92			
cM capacity (veh/h)	116	747	360			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	27	866	866	823	823	193
Volume Left	27	0	0	0	0	0
Volume Right	0	0	0	0	0	193
cSH	360	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.51	0.51	0.48	0.48	0.11
Queue Length 95th (ft)	6	0	0	0	0	0
Control Delay (s)	15.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.2			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		64.2%		ICU Level of Service		C
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↓	↖	↙	↗	↘
Traffic Volume (veh/h)	215	35	135	85	10	45
Future Volume (Veh/h)	215	35	135	85	10	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	234	38	147	92	11	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		272		639	253	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		272		639	253	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		89		97	94	
cM capacity (veh/h)		1291		390	786	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	272	239	60			
Volume Left	0	147	11			
Volume Right	38	0	49			
cSH	1700	1291	663			
Volume to Capacity	0.16	0.11	0.09			
Queue Length 95th (ft)	0	10	7			
Control Delay (s)	0.0	5.4	11.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	5.4	11.0			
Approach LOS			B			
Intersection Summary						
Average Delay		3.4				
Intersection Capacity Utilization		38.7%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	75	160	35	55	160	250	15	175	20	155	295	60
Future Volume (vph)	75	160	35	55	160	250	15	175	20	155	295	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	174	38	60	174	272	16	190	22	168	321	65
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	294	506	228	554								
Volume Left (vph)	82	60	16	168								
Volume Right (vph)	38	272	22	65								
Hadj (s)	0.01	-0.26	-0.01	0.02								
Departure Headway (s)	8.4	7.5	8.7	7.8								
Degree Utilization, x	0.69	1.06	0.55	1.20								
Capacity (veh/h)	416	474	393	457								
Control Delay (s)	28.0	84.6	22.0	135.5								
Approach Delay (s)	28.0	84.6	22.0	135.5								
Approach LOS	D	F	C	F								
<b>Intersection Summary</b>												
Delay					82.9							
Level of Service					F							
Intersection Capacity Utilization				78.5%		ICU Level of Service				D		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	26	1670	1586	186
Future Volume (Veh/h)	0	0	26	1670	1586	186
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	28	1815	1724	202
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.78	0.68	0.68			
vC, conflicting volume	2688	862	1926			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1464	0	1415			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	91			
cM capacity (veh/h)	84	735	324			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	28	908	908	862	862	202
Volume Left	28	0	0	0	0	0
Volume Right	0	0	0	0	0	202
cSH	324	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.53	0.53	0.51	0.51	0.12
Queue Length 95th (ft)	7	0	0	0	0	0
Control Delay (s)	17.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.3			0.0		
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		60.1%		ICU Level of Service		B
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↓	↖	↗	↖	↗
Traffic Volume (veh/h)	215	35	135	85	10	45
Future Volume (Veh/h)	215	35	135	85	10	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	234	38	147	92	11	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)			335			
pX, platoon unblocked						
vC, conflicting volume		272		639	253	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		272		639	253	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		89		97	94	
cM capacity (veh/h)		1291		390	786	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	272	239	60			
Volume Left	0	147	11			
Volume Right	38	0	49			
cSH	1700	1291	663			
Volume to Capacity	0.16	0.11	0.09			
Queue Length 95th (ft)	0	10	7			
Control Delay (s)	0.0	5.4	11.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	5.4	11.0			
Approach LOS			B			
Intersection Summary						
Average Delay		3.4				
Intersection Capacity Utilization		38.7%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	20	120	0	10	20	90	5	50	15	120	20	15
Future Volume (vph)	20	120	0	10	20	90	5	50	15	120	20	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	130	0	11	22	98	5	54	16	130	22	16
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	152	131	75	168								
Volume Left (vph)	22	11	5	130								
Volume Right (vph)	0	98	16	16								
Hadj (s)	0.06	-0.40	-0.08	0.13								
Departure Headway (s)	4.7	4.3	4.7	4.8								
Degree Utilization, x	0.20	0.16	0.10	0.22								
Capacity (veh/h)	713	778	708	703								
Control Delay (s)	8.9	8.1	8.2	9.2								
Approach Delay (s)	8.9	8.1	8.2	9.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					8.7							
Level of Service					A							
Intersection Capacity Utilization				33.6%		ICU Level of Service				A		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	26	1670	1586	186
Future Volume (Veh/h)	0	0	26	1670	1586	186
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	28	1815	1724	202
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.79	0.68	0.68			
vC, conflicting volume	2688	862	1926			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1301	0	1415			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	91			
cM capacity (veh/h)	110	735	324			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	28	908	908	862	862	202
Volume Left	28	0	0	0	0	0
Volume Right	0	0	0	0	0	202
cSH	324	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.53	0.53	0.51	0.51	0.12
Queue Length 95th (ft)	7	0	0	0	0	0
Control Delay (s)	17.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.3			0.0		
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		66.6%		ICU Level of Service		C
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑→	↓→	↑←	↓←	↑↖	↓↖
Traffic Volume (veh/h)	125	20	35	145	35	65
Future Volume (Veh/h)	125	20	35	145	35	65
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	136	22	38	158	38	71
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		158		381	147	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		158		381	147	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		97		94	92	
cM capacity (veh/h)		1422		605	900	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	158	196	109			
Volume Left	0	38	38			
Volume Right	22	0	71			
cSH	1700	1422	769			
Volume to Capacity	0.09	0.03	0.14			
Queue Length 95th (ft)	0	2	12			
Control Delay (s)	0.0	1.7	10.5			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.7	10.5			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay		3.2				
Intersection Capacity Utilization		33.3%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	85	130	50	30	165	145	10	170	30	245	375	50
Future Volume (vph)	85	130	50	30	165	145	10	170	30	245	375	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	141	54	33	179	158	11	185	33	266	408	54
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	287	370	229	728								
Volume Left (vph)	92	33	11	266								
Volume Right (vph)	54	158	33	54								
Hadj (s)	-0.01	-0.20	-0.04	0.06								
Departure Headway (s)	7.8	7.4	7.9	7.3								
Degree Utilization, x	0.62	0.76	0.51	1.47								
Capacity (veh/h)	436	468	416	487								
Control Delay (s)	22.8	29.7	18.8	241.8								
Approach Delay (s)	22.8	29.7	18.8	241.8								
Approach LOS	C	D	C	F								
Intersection Summary												
Delay					122.6							
Level of Service						F						
Intersection Capacity Utilization				93.2%			ICU Level of Service				F	
Analysis Period (min)					15							

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	5	2306	1747	40
Future Volume (Veh/h)	0	0	5	2306	1747	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	2507	1899	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.41	0.66	0.66			
vC, conflicting volume	3162	950	1942			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	1403			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	413	718	320			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	5	1254	1254	950	950	43
Volume Left	5	0	0	0	0	0
Volume Right	0	0	0	0	0	43
cSH	320	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.74	0.74	0.56	0.56	0.03
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	16.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.0			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization		81.2%		ICU Level of Service		D
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Volume (veh/h)	125	20	35	145	35	65
Future Volume (Veh/h)	125	20	35	145	35	65
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	136	22	38	158	38	71
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)			335			
pX, platoon unblocked						
vC, conflicting volume		158		381	147	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		158		381	147	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		97		94	92	
cM capacity (veh/h)		1422		605	900	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	158	196	109			
Volume Left	0	38	38			
Volume Right	22	0	71			
cSH	1700	1422	769			
Volume to Capacity	0.09	0.03	0.14			
Queue Length 95th (ft)	0	2	12			
Control Delay (s)	0.0	1.7	10.5			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.7	10.5			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay		3.2				
Intersection Capacity Utilization		33.3%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	65	5	10	100	80	5	20	15	110	50	10
Future Volume (vph)	5	65	5	10	100	80	5	20	15	110	50	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	71	5	11	109	87	5	22	16	120	54	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	81	207	43	185								
Volume Left (vph)	5	11	5	120								
Volume Right (vph)	5	87	16	11								
Hadj (s)	0.01	-0.21	-0.17	0.13								
Departure Headway (s)	4.7	4.4	4.6	4.8								
Degree Utilization, x	0.11	0.25	0.06	0.24								
Capacity (veh/h)	708	778	713	711								
Control Delay (s)	8.3	8.8	7.9	9.3								
Approach Delay (s)	8.3	8.8	7.9	9.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					8.8							
Level of Service					A							
Intersection Capacity Utilization				35.8%		ICU Level of Service				A		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

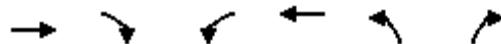


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	5	2306	1747	40
Future Volume (Veh/h)	0	0	5	2306	1747	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	2507	1899	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.41	0.66	0.66			
vC, conflicting volume	3162	950	1942			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	1403			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	413	718	320			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	5	1254	1254	950	950	43
Volume Left	5	0	0	0	0	0
Volume Right	0	0	0	0	0	43
cSH	320	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.74	0.74	0.56	0.56	0.03
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	16.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.0			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization		81.6%		ICU Level of Service		D
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↓	↖	↙	↗	↘
Traffic Volume (veh/h)	155	25	40	170	35	70
Future Volume (Veh/h)	155	25	40	170	35	70
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	27	43	185	38	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		195		452	182	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		195		452	182	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		97		93	91	
cM capacity (veh/h)		1378		547	861	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	195	228	114			
Volume Left	0	43	38			
Volume Right	27	0	76			
cSH	1700	1378	723			
Volume to Capacity	0.11	0.03	0.16			
Queue Length 95th (ft)	0	2	14			
Control Delay (s)	0.0	1.7	10.9			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.7	10.9			
Approach LOS			B			
Intersection Summary						
Average Delay		3.0				
Intersection Capacity Utilization		37.1%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	105	140	60	45	185	155	15	175	35	255	400	60
Future Volume (vph)	105	140	60	45	185	155	15	175	35	255	400	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	152	65	49	201	168	16	190	38	277	435	65
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	331	418	244	777								
Volume Left (vph)	114	49	16	277								
Volume Right (vph)	65	168	38	65								
Hadj (s)	-0.01	-0.18	-0.05	0.06								
Departure Headway (s)	8.3	7.8	8.7	8.1								
Degree Utilization, x	0.76	0.91	0.59	1.74								
Capacity (veh/h)	418	418	388	447								
Control Delay (s)	33.5	50.8	23.5	361.2								
Approach Delay (s)	33.5	50.8	23.5	361.2								
Approach LOS	D	F	C	F								
Intersection Summary												
Delay					180.0							
Level of Service					F							
Intersection Capacity Utilization				98.5%		ICU Level of Service				F		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	5	2678	2029	47
Future Volume (Veh/h)	0	0	5	2678	2029	47
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	2911	2205	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.42	0.65	0.65			
vC, conflicting volume	3670	1102	2256			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	801	73	1852			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	130	632	210			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	5	1456	1456	1102	1102	51
Volume Left	5	0	0	0	0	0
Volume Right	0	0	0	0	0	51
cSH	210	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.86	0.86	0.65	0.65	0.03
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	22.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.0			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization		152.0%		ICU Level of Service		H
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↓	↖	↙	↗	↘
Traffic Volume (veh/h)	155	25	40	170	35	70
Future Volume (Veh/h)	155	25	40	170	35	70
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	27	43	185	38	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)			335			
pX, platoon unblocked						
vC, conflicting volume		195		452	182	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		195		452	182	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		97		93	91	
cM capacity (veh/h)		1378		547	861	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	195	228	114			
Volume Left	0	43	38			
Volume Right	27	0	76			
cSH	1700	1378	723			
Volume to Capacity	0.11	0.03	0.16			
Queue Length 95th (ft)	0	2	14			
Control Delay (s)	0.0	1.7	10.9			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.7	10.9			
Approach LOS			B			
Intersection Summary						
Average Delay		3.0				
Intersection Capacity Utilization		37.1%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	70	10	10	105	90	5	20	15	125	45	10
Future Volume (vph)	5	70	10	10	105	90	5	20	15	125	45	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	76	11	11	114	98	5	22	16	136	49	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	92	223	43	196								
Volume Left (vph)	5	11	5	136								
Volume Right (vph)	11	98	16	11								
Hadj (s)	-0.03	-0.22	-0.17	0.14								
Departure Headway (s)	4.7	4.4	4.7	4.8								
Degree Utilization, x	0.12	0.27	0.06	0.26								
Capacity (veh/h)	703	771	693	698								
Control Delay (s)	8.4	9.0	8.0	9.6								
Approach Delay (s)	8.4	9.0	8.0	9.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					9.0							
Level of Service					A							
Intersection Capacity Utilization				37.5%		ICU Level of Service				A		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

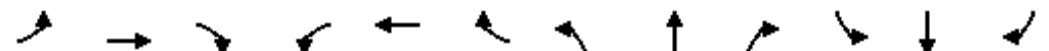


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	5	2678	2029	47
Future Volume (Veh/h)	0	0	5	2678	2029	47
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	2911	2205	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.42	0.65	0.65			
vC, conflicting volume	3670	1102	2256			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	801	73	1852			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	130	632	210			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	5	1456	1456	1102	1102	51
Volume Left	5	0	0	0	0	0
Volume Right	0	0	0	0	0	51
cSH	210	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.86	0.86	0.65	0.65	0.03
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	22.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.0			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization		92.4%		ICU Level of Service		F
Analysis Period (min)		15				

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	25	360	30	22	35	376	1415	15	45	1275	44
Future Volume (vph)	43	25	360	30	22	35	376	1415	15	45	1275	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.908			0.998			0.995	
Flt Protected		0.969		0.950			0.950			0.950		
Satd. Flow (prot)	0	1805	1583	1770	1691	0	1770	3532	0	1770	3522	0
Flt Permitted		0.780		0.709			0.107			0.950		
Satd. Flow (perm)	0	1453	1583	1321	1691	0	199	3532	0	1770	3522	0
Right Turn on Red		Yes			Yes				Yes			Yes
Satd. Flow (RTOR)		391		38			2			4		
Link Speed (mph)		30		30			30			30		
Link Distance (ft)		1428		412			717			433		
Travel Time (s)		32.5		9.4			16.3			9.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	27	391	33	24	38	409	1538	16	49	1386	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	74	391	33	62	0	409	1554	0	49	1434	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16		16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	11.7	11.7	11.7	11.7	11.7		61.4	61.4		7.9	47.3	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.68	0.68		0.09	0.53	
v/c Ratio	0.39	0.72	0.19	0.25			0.95	0.65		0.31	0.77	
Control Delay	39.8	11.6	34.6	18.4			62.7	12.7		43.1	22.3	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	39.8	11.6	34.6	18.4			62.7	12.7		43.1	22.3	
LOS	D	B	C	B			E	B		D	C	
Approach Delay	16.1				24.0				23.1			23.0
Approach LOS	B				C			C			C	
Queue Length 50th (ft)	40	0	17	12		173	259		27	314		
Queue Length 95th (ft)	72	73	40	43		#392	494		60	#562		
Internal Link Dist (ft)	1348				332			637			353	
Turn Bay Length (ft)		200				150			300			
Base Capacity (vph)	339	669	308	423		432	2409		158	1852		
Starvation Cap Reductn	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.22	0.58	0.11	0.15		0.95	0.65		0.31	0.77		

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 22.3 Intersection LOS: C

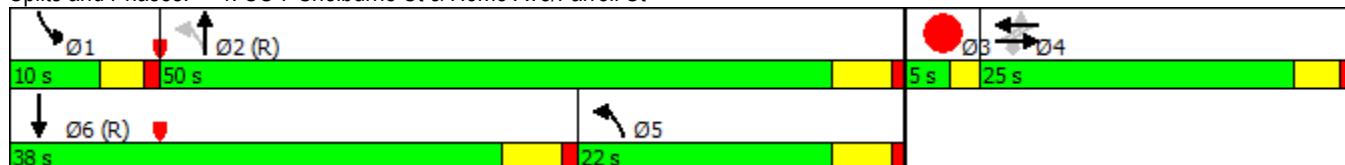
Intersection Capacity Utilization 79.5% ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
<u>Intersection Summary</u>	

# HCM Signalized Intersection Capacity Analysis

4: US 7 Shelburne St & Home Ave/Farrell St

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	25	360	30	22	35	376	1415	15	45	1275	44
Future Volume (vph)	43	25	360	30	22	35	376	1415	15	45	1275	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95		
Frt	1.00	0.85	1.00	0.91			1.00	1.00	1.00	1.00	0.99	
Flt Protected	0.97	1.00	0.95	1.00			0.95	1.00	0.95	1.00		
Satd. Flow (prot)	1805	1583	1770	1691			1770	3534		1770	3521	
Flt Permitted	0.78	1.00	0.71	1.00			0.11	1.00	0.95	1.00		
Satd. Flow (perm)	1454	1583	1320	1691			199	3534		1770	3521	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	27	391	33	24	38	409	1538	16	49	1386	48
RTOR Reduction (vph)	0	0	340	0	33	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	74	51	33	29	0	409	1553	0	49	1432	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	11.7	11.7	11.7	11.7	11.7		59.8	59.8		5.5	45.7	
Effective Green, g (s)	11.7	11.7	11.7	11.7	11.7		59.8	59.8		5.5	45.7	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.66	0.66		0.06	0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	189	205	171	219			456	2348		108	1787	
v/s Ratio Prot				0.02			c0.19	0.44		0.03	c0.41	
v/s Ratio Perm	c0.05	0.03	0.02				c0.41					
v/c Ratio	0.39	0.25	0.19	0.13			0.90	0.66		0.45	0.80	
Uniform Delay, d1	35.9	35.2	34.9	34.7	34.7		23.5	9.0		40.8	18.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.6	0.6	0.3	0.3		19.8	1.5		3.0	3.9	
Delay (s)	37.2	35.8	35.5	34.9	34.9		43.3	10.5		43.8	22.3	
Level of Service	D	D	D	C			D	B		D	C	
Approach Delay (s)	36.1			35.1				17.4			23.0	
Approach LOS	D			D			B			C		

## Intersection Summary

HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	276	11	0	2055	1747	0	
Future Volume (vph)	276	11	0	2055	1747	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Fr <sub>t</sub>			0.850				
Flt Protected		0.953					
Satd. Flow (prot)	1775	1504	0	3539	3539	0	
Flt Permitted		0.953					
Satd. Flow (perm)	1775	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)		11					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	300	12	0	2234	1899	0	
Shared Lane Traffic (%)		10%					
Lane Group Flow (vph)	301	11	0	2234	1899	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	
Total Split (s)	24.0	24.0		82.0	82.0	24.0	
Total Split (%)	18.5%	18.5%		63.1%	63.1%	18%	
Maximum Green (s)	18.0	18.0		76.0	76.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead			Lag		
Lead-Lag Optimize?	Yes	Yes			Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0	0.2	
Recall Mode	None	None		C-Max	C-Max	None	
Walk Time (s)	0.0	0.0		0.0	0.0	5.0	
Flash Dont Walk (s)	0.0	0.0		17.0	17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	
Act Effct Green (s)	18.0	18.0		100.0	100.0		

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Actuated g/C Ratio	0.14	0.14		0.77	0.77		
v/c Ratio	1.23	0.05		0.82	0.70		
Control Delay	179.4	23.4		12.7	9.2		
Queue Delay	0.0	0.0		0.0	23.6		
Total Delay	179.4	23.4		12.7	32.7		
LOS	F	C		B	C		
Approach Delay	173.9			12.7	32.7		
Approach LOS	F			B	C		
Queue Length 50th (ft)	~312	0		532	360		
Queue Length 95th (ft)	#496	20		638	427		
Internal Link Dist (ft)	258			305	166		
Turn Bay Length (ft)							
Base Capacity (vph)	245	217		2722	2722		
Starvation Cap Reductn	0	0		0	897		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	1.23	0.05		0.82	1.04		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.23

Intersection Signal Delay: 32.6

Intersection LOS: C

Intersection Capacity Utilization 82.3%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	276	11	0	2055	1747	0
Future Volume (vph)	276	11	0	2055	1747	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1773	1504		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1773	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	300	12	0	2234	1899	0
RTOR Reduction (vph)	0	9	0	0	0	0
Lane Group Flow (vph)	301	2	0	2234	1899	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	18.0	18.0		100.0	100.0	
Effective Green, g (s)	18.0	18.0		100.0	100.0	
Actuated g/C Ratio	0.14	0.14		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	245	208		2722	2722	
v/s Ratio Prot	c0.17	0.00		c0.63	0.54	
v/s Ratio Perm						
v/c Ratio	1.23	0.01		0.82	0.70	
Uniform Delay, d1	56.0	48.3		9.4	7.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	133.3	0.0		2.9	1.5	
Delay (s)	189.3	48.3		12.3	9.0	
Level of Service	F	D		B	A	
Approach Delay (s)	184.4			12.3	9.0	
Approach LOS	F			B	A	
Intersection Summary						
HCM 2000 Control Delay		23.0		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		0.90				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		82.3%		ICU Level of Service	E	
Analysis Period (min)		15				
c Critical Lane Group						

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1378	135	0	0	890	0	0	1965	5
Future Volume (vph)	0	0	0	1378	135	0	0	890	0	0	1965	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt												
Flt Protected					0.950	0.961						
Satd. Flow (prot)	0	0	0	1681	1701	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.961						
Satd. Flow (perm)	0	0	0	1681	1701	0	0	3539	0	0	5085	0
Right Turn on Red				Yes			Yes			Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1498	147	0	0	967	0	0	2136	5
Shared Lane Traffic (%)				45%								
Lane Group Flow (vph)	0	0	0	824	821	0	0	967	0	0	2141	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effct Green (s)				48.2	48.2			30.8			30.8	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio				0.54	0.54			0.34			0.34	
v/c Ratio				0.92	0.90			0.80			1.23	
Control Delay				35.8	33.8			33.1			137.5	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				35.8	33.8			33.1			137.5	
LOS				D	C			C			F	
Approach Delay					34.8			33.1			137.5	
Approach LOS					C			C			F	
Queue Length 50th (ft)				413	406			262			~566	
Queue Length 95th (ft)				#695	#684			341			#662	
Internal Link Dist (ft)		52			64			652			60	
Turn Bay Length (ft)												
Base Capacity (vph)				915	926			1211			1741	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.90	0.89			0.80			1.23	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.23

Intersection Signal Delay: 80.7

Intersection LOS: F

Intersection Capacity Utilization 89.0%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

02/28/2020

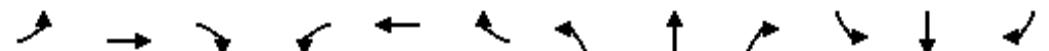


Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1378	135	0	0	890	0	0	1965	5
Future Volume (vph)	0	0	0	1378	135	0	0	890	0	0	1965	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1700			3539		5084	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1700			3539		5084	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1498	147	0	0	967	0	0	2136	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	824	821	0	0	967	0	0	2141	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				48.2	48.2			30.8			30.8	
Effective Green, g (s)				48.2	48.2			30.8			30.8	
Actuated g/C Ratio				0.54	0.54			0.34			0.34	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				900	910			1211			1739	
v/s Ratio Prot				c0.49	0.48			0.27			c0.42	
v/s Ratio Perm												
v/c Ratio				0.92	0.90			0.80			1.23	
Uniform Delay, d1				19.0	18.8			26.8			29.6	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				13.7	12.0			5.6			109.3	
Delay (s)				32.7	30.8			32.3			138.9	
Level of Service				C	C			C			F	
Approach Delay (s)	0.0				31.8			32.3			138.9	
Approach LOS	A				C			C			F	
Intersection Summary												
HCM 2000 Control Delay				80.1				HCM 2000 Level of Service			F	
HCM 2000 Volume to Capacity ratio				1.04								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				89.0%				ICU Level of Service			E	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	276	15	5	10	367	1390	10	10	835	55
Future Volume (vph)	50	10	276	15	5	10	367	1390	10	10	835	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.897			0.999			0.991	
Flt Protected		0.960		0.950			0.950			0.950		
Satd. Flow (prot)	0	1788	1583	1770	1671	0	1770	3536	0	1770	3507	0
Flt Permitted		0.751		0.715			0.249			0.950		
Satd. Flow (perm)	0	1399	1583	1332	1671	0	464	3536	0	1770	3507	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		300			11			1			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1428			412			717			433	
Travel Time (s)		32.5			9.4			16.3			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	300	16	5	11	399	1511	11	11	908	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	300	16	16	0	399	1522	0	11	968	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	10.3	10.3	10.3	10.3	10.3		68.4	68.4		6.2	48.7	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.76	0.76		0.07	0.54	
v/c Ratio	0.41	0.67	0.11	0.08			0.67	0.57		0.09	0.51	
Control Delay	42.9	12.3	34.5	20.8			21.0	7.1		40.5	14.9	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	42.9	12.3	34.5	20.8			21.0	7.1		40.5	14.9	
LOS	D	B	C	C			C	A		D	B	
Approach Delay	17.8				27.7			10.0			15.2	
Approach LOS	B				C			A			B	
Queue Length 50th (ft)	35	0	8	3		44	120		6	166		
Queue Length 95th (ft)	69	68	25	20		#227	387		22	263		
Internal Link Dist (ft)	1348				332			637			353	
Turn Bay Length (ft)		200				150			300			
Base Capacity (vph)	326	599	310	398		599	2687		125	1899		
Starvation Cap Reductn	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.20	0.50	0.05	0.04			0.67	0.57		0.09	0.51	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 12.6

Intersection LOS: B

Intersection Capacity Utilization 66.8%

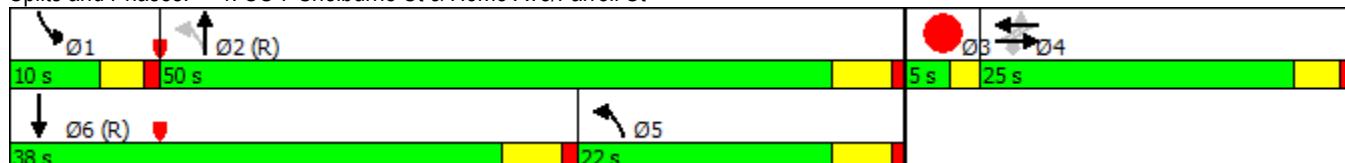
ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
<u>Intersection Summary</u>	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

02/28/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	276	15	5	10	367	1390	10	10	835	55
Future Volume (vph)	50	10	276	15	5	10	367	1390	10	10	835	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00			1.00	0.95		1.00	0.95	
Frt	1.00	0.85	1.00	0.90			1.00	1.00		1.00	0.99	
Flt Protected	0.96	1.00	0.95	1.00			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1788	1583	1770	1671			1770	3535		1770	3506	
Flt Permitted	0.75	1.00	0.71	1.00			0.25	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1583	1331	1671			465	3535		1770	3506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	300	16	5	11	399	1511	11	11	908	60
RTOR Reduction (vph)	0	0	266	0	10	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	65	34	16	6	0	399	1522	0	11	964	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	10.3	10.3	10.3	10.3			65.2	65.2		1.5	45.5	
Effective Green, g (s)	10.3	10.3	10.3	10.3			65.2	65.2		1.5	45.5	
Actuated g/C Ratio	0.11	0.11	0.11	0.11			0.72	0.72		0.02	0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	160	181	152	191			629	2560		29	1772	
v/s Ratio Prot				0.00			0.14	c0.43		0.01	c0.27	
v/s Ratio Perm	c0.05	0.02	0.01				c0.32					
v/c Ratio	0.41	0.19	0.11	0.03			0.63	0.59		0.38	0.54	
Uniform Delay, d1	37.0	36.1	35.7	35.4			13.1	6.0		43.8	15.2	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.5	0.3	0.1			2.1	1.0		8.1	1.2	
Delay (s)	38.7	36.6	36.0	35.5			15.2	7.0		51.9	16.4	
Level of Service	D	D	D	D			B	A		D	B	
Approach Delay (s)	37.0			35.8				8.7			16.8	
Approach LOS	D			D			A				B	
Intersection Summary												
HCM 2000 Control Delay		14.5					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		90.0					Sum of lost time (s)			16.0		
Intersection Capacity Utilization		66.8%					ICU Level of Service			C		
Analysis Period (min)		15										
c Critical Lane Group												

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	97	16	0	1523	1514	0	
Future Volume (vph)	97	16	0	1523	1514	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Fr <sub>t</sub>	0.997	0.850					
Flt Protected	0.953						
Satd. Flow (prot)	1770	1504	0	3539	3539	0	
Flt Permitted	0.953						
Satd. Flow (perm)	1770	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	1	15					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	105	17	0	1655	1646	0	
Shared Lane Traffic (%)		10%					
Lane Group Flow (vph)	107	15	0	1655	1646	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	
Total Split (s)	24.0	24.0		82.0	82.0	24.0	
Total Split (%)	18.5%	18.5%		63.1%	63.1%	18%	
Maximum Green (s)	18.0	18.0		76.0	76.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead			Lag		
Lead-Lag Optimize?	Yes	Yes			Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0	0.2	
Recall Mode	None	None		C-Max	C-Max	None	
Walk Time (s)	0.0	0.0		0.0	0.0	5.0	
Flash Dont Walk (s)	0.0	0.0		17.0	17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	
Act Effct Green (s)	12.1	12.1		105.9	105.9		

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Actuated g/C Ratio	0.09	0.09		0.81	0.81		
v/c Ratio	0.64	0.10		0.57	0.57		
Control Delay	73.4	23.0		5.5	5.4		
Queue Delay	0.0	0.0		0.0	3.3		
Total Delay	73.4	23.0		5.5	8.7		
LOS	E	C		A	A		
Approach Delay	67.2			5.5	8.7		
Approach LOS	E			A	A		
Queue Length 50th (ft)	88	0		205	204		
Queue Length 95th (ft)	145	23		313	309		
Internal Link Dist (ft)	258			305	166		
Turn Bay Length (ft)							
Base Capacity (vph)	245	221		2882	2882		
Starvation Cap Reductn	0	0		0	1108		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.44	0.07		0.57	0.93		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 9.2

Intersection LOS: A

Intersection Capacity Utilization 57.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	97	16	0	1523	1514	0
Future Volume (vph)	97	16	0	1523	1514	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1771	1504		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1771	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	105	17	0	1655	1646	0
RTOR Reduction (vph)	1	14	0	0	0	0
Lane Group Flow (vph)	106	1	0	1655	1646	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	12.1	12.1		105.9	105.9	
Effective Green, g (s)	12.1	12.1		105.9	105.9	
Actuated g/C Ratio	0.09	0.09		0.81	0.81	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	164	139		2882	2882	
v/s Ratio Prot	c0.06	0.00		c0.47	0.47	
v/s Ratio Perm						
v/c Ratio	0.65	0.01		0.57	0.57	
Uniform Delay, d1	56.9	53.5		4.2	4.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.4	0.0		0.8	0.8	
Delay (s)	63.3	53.5		5.0	5.0	
Level of Service	E	D		A	A	
Approach Delay (s)	62.1			5.0	5.0	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay		7.1		HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio		0.59				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)		14.0
Intersection Capacity Utilization		57.8%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1367	50	0	0	890	0	0	1196	0
Future Volume (vph)	0	0	0	1367	50	0	0	890	0	0	1196	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Frt												
Flt Protected					0.950	0.956						
Satd. Flow (prot)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.956						
Satd. Flow (perm)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Right Turn on Red				Yes			Yes			Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1486	54	0	0	967	0	0	1300	0
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	773	767	0	0	967	0	0	1300	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effct Green (s)				47.3	47.3			31.7			31.7	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio				0.53	0.53			0.35			0.35	
v/c Ratio				0.88	0.86			0.78			0.73	
Control Delay				31.4	30.1			31.8			28.7	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				31.4	30.1			31.8			28.7	
LOS				C	C			C			C	
Approach Delay					30.8			31.8			28.7	
Approach LOS					C			C			C	
Queue Length 50th (ft)				366	358			262			240	
Queue Length 95th (ft)				#627	#615			341			294	
Internal Link Dist (ft)		52				64			652			60
Turn Bay Length (ft)												
Base Capacity (vph)				915	921			1247			1792	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.84	0.83			0.78			0.73	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 30.3

Intersection LOS: C

Intersection Capacity Utilization 73.3%

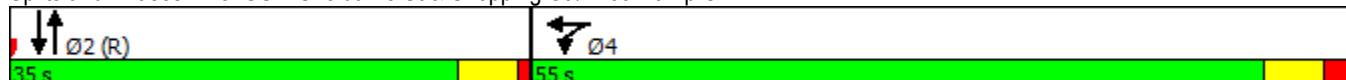
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

02/28/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1367	50	0	0	890	0	0	1196	0
Future Volume (vph)	0	0	0	1367	50	0	0	890	0	0	1196	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1691			3539		5085	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1691			3539		5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1486	54	0	0	967	0	0	1300	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	773	767	0	0	967	0	0	1300	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				47.3	47.3			31.7			31.7	
Effective Green, g (s)				47.3	47.3			31.7			31.7	
Actuated g/C Ratio				0.53	0.53			0.35			0.35	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				883	888			1246			1791	
v/s Ratio Prot				c0.46	0.45			c0.27			0.26	
v/s Ratio Perm												
v/c Ratio				0.88	0.86			0.78			0.73	
Uniform Delay, d1				18.8	18.6			26.0			25.4	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				9.7	8.7			4.8			2.6	
Delay (s)				28.4	27.3			30.8			28.0	
Level of Service				C	C			C			C	
Approach Delay (s)	0.0				27.9			30.8			28.0	
Approach LOS	A				C			C			C	
Intersection Summary												
HCM 2000 Control Delay				28.6				HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio				0.84								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				73.3%				ICU Level of Service			D	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	25	385	30	22	35	416	1480	15	45	1325	44
Future Volume (vph)	43	25	385	30	22	35	416	1480	15	45	1325	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.908			0.999			0.995	
Flt Protected		0.969		0.950			0.950			0.950		
Satd. Flow (prot)	0	1805	1583	1770	1691	0	1770	3536	0	1770	3522	0
Flt Permitted		0.782		0.709			0.098			0.950		
Satd. Flow (perm)	0	1457	1583	1321	1691	0	183	3536	0	1770	3522	0
Right Turn on Red		Yes			Yes				Yes			Yes
Satd. Flow (RTOR)		418		38			2			4		
Link Speed (mph)		30		30			30			30		
Link Distance (ft)		1428		412			717			433		
Travel Time (s)		32.5		9.4			16.3			9.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	27	418	33	24	38	452	1609	16	49	1440	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	74	418	33	62	0	452	1625	0	49	1488	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	11.9	11.9	11.9	11.9	11.9		61.2	61.2		8.0	47.1	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.68	0.68		0.09	0.52	
v/c Ratio	0.39	0.73	0.19	0.24			1.07	0.68		0.31	0.81	
Control Delay	39.4	11.6	34.3	18.2			94.1	13.6		43.0	23.6	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	39.4	11.6	34.3	18.2			94.1	13.6		43.0	23.6	
LOS	D	B	C	B			F	B		D	C	
Approach Delay	15.8				23.8			31.1			24.3	
Approach LOS	B				C			C			C	
Queue Length 50th (ft)	40	0	17	12		~238	281		27	335		
Queue Length 95th (ft)	71	75	39	42		#461	#601		60	#606		
Internal Link Dist (ft)	1348				332			637			353	
Turn Bay Length (ft)		200				150			300			
Base Capacity (vph)	340	690	309	424		424	2406		158	1846		
Starvation Cap Reductn	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.22	0.61	0.11	0.15		1.07	0.68		0.31	0.81		

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 26.7

Intersection LOS: C

Intersection Capacity Utilization 83.1%

ICU Level of Service E

Analysis Period (min) 15

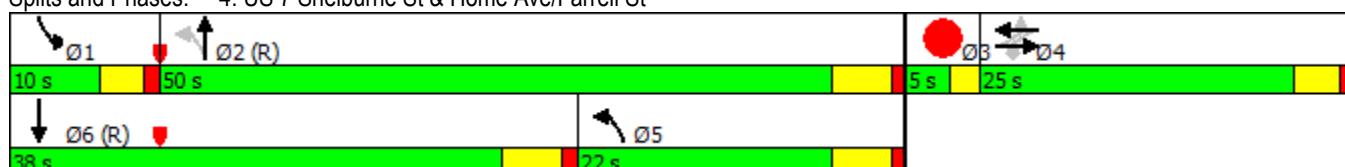
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
<u>Intersection Summary</u>	

# HCM Signalized Intersection Capacity Analysis

4: US 7 Shelburne St & Home Ave/Farrell St

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	25	385	30	22	35	416	1480	15	45	1325	44
Future Volume (vph)	43	25	385	30	22	35	416	1480	15	45	1325	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95		
Frt	1.00	0.85	1.00	0.91			1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.97	1.00	0.95	1.00			0.95	1.00	0.95	1.00		
Satd. Flow (prot)	1805	1583	1770	1691			1770	3534		1770	3522	
Flt Permitted	0.78	1.00	0.71	1.00			0.10	1.00	0.95	1.00		
Satd. Flow (perm)	1456	1583	1320	1691			182	3534		1770	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	47	27	418	33	24	38	452	1609	16	49	1440	48
RTOR Reduction (vph)	0	0	363	0	33	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	74	55	33	29	0	452	1624	0	49	1486	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	11.9	11.9	11.9	11.9	11.9		59.6	59.6		5.5	45.5	
Effective Green, g (s)	11.9	11.9	11.9	11.9	11.9		59.6	59.6		5.5	45.5	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.66	0.66		0.06	0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	209	174	223			448	2340		108	1780	
v/s Ratio Prot				0.02			c0.21	0.46		0.03	c0.42	
v/s Ratio Perm	c0.05	0.03	0.02				c0.46					
v/c Ratio	0.39	0.26	0.19	0.13			1.01	0.69		0.45	0.83	
Uniform Delay, d1	35.7	35.1	34.8	34.5			25.7	9.5		40.8	19.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.7	0.5	0.3			44.8	1.7		3.0	4.8	
Delay (s)	37.0	35.8	35.3	34.7			70.4	11.2		43.8	23.8	
Level of Service	D	D	D	C			E	B		D	C	
Approach Delay (s)	36.0			34.9				24.1			24.5	
Approach LOS	D			C			C			C		

## Intersection Summary

HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	317	13	0	2386	2029	0	
Future Volume (vph)	317	13	0	2386	2029	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Fr <sub>t</sub>			0.850				
Flt Protected			0.953				
Satd. Flow (prot)	1775	1504	0	3539	3539	0	
Flt Permitted			0.953				
Satd. Flow (perm)	1775	1504	0	3539	3539	0	
Right Turn on Red			Yes			Yes	
Satd. Flow (RTOR)			13				
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	345	14	0	2593	2205	0	
Shared Lane Traffic (%)			10%				
Lane Group Flow (vph)	346	13	0	2593	2205	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	
Total Split (s)	24.0	24.0		82.0	82.0	24.0	
Total Split (%)	18.5%	18.5%		63.1%	63.1%	18%	
Maximum Green (s)	18.0	18.0		76.0	76.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead				Lag	
Lead-Lag Optimize?	Yes	Yes				Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	0.2	
Recall Mode	None	None		C-Max	C-Max	None	
Walk Time (s)	0.0	0.0		0.0	0.0	5.0	
Flash Dont Walk (s)	0.0	0.0		17.0	17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	
Act Effct Green (s)	18.0	18.0		100.0	100.0		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Actuated g/C Ratio	0.14	0.14		0.77	0.77		
v/c Ratio	1.41	0.06		0.95	0.81		
Control Delay	248.4	22.4		23.0	12.3		
Queue Delay	0.0	0.0		0.0	46.1		
Total Delay	248.4	22.4		23.0	58.5		
LOS	F	C		C	E		
Approach Delay	240.2			23.0	58.5		
Approach LOS	F			C	E		
Queue Length 50th (ft)	~391	0		852	513		
Queue Length 95th (ft)	#583	21		#1067	614		
Internal Link Dist (ft)	258			305	166		
Turn Bay Length (ft)							
Base Capacity (vph)	245	219		2722	2722		
Starvation Cap Reductn	0	0		0	714		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	1.41	0.06		0.95	1.10		

**Intersection Summary**

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.41

Intersection Signal Delay: 53.3

Intersection LOS: D

Intersection Capacity Utilization 153.2%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	317	13	0	2386	2029	0
Future Volume (vph)	317	13	0	2386	2029	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1774	1504		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1774	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	345	14	0	2593	2205	0
RTOR Reduction (vph)	0	11	0	0	0	0
Lane Group Flow (vph)	346	2	0	2593	2205	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	18.0	18.0		100.0	100.0	
Effective Green, g (s)	18.0	18.0		100.0	100.0	
Actuated g/C Ratio	0.14	0.14		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	245	208		2722	2722	
v/s Ratio Prot	c0.20	0.00		c0.73	0.62	
v/s Ratio Perm						
v/c Ratio	1.41	0.01		0.95	0.81	
Uniform Delay, d1	56.0	48.3		13.0	9.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	208.0	0.0		9.3	2.7	
Delay (s)	264.0	48.3		22.2	11.9	
Level of Service	F	D		C	B	
Approach Delay (s)	256.2			22.2	11.9	
Approach LOS	F			C	B	
Intersection Summary						
HCM 2000 Control Delay		34.1		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		1.04				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		153.2%		ICU Level of Service	H	
Analysis Period (min)		15				
c Critical Lane Group						

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020

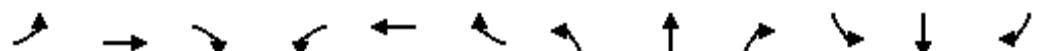


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1508	140	0	0	890	0	0	2050	5
Future Volume (vph)	0	0	0	1508	140	0	0	890	0	0	2050	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt												
Flt Protected					0.950	0.960						
Satd. Flow (prot)	0	0	0	1681	1699	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.960						
Satd. Flow (perm)	0	0	0	1681	1699	0	0	3539	0	0	5085	0
Right Turn on Red				Yes			Yes			Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1639	152	0	0	967	0	0	2228	5
Shared Lane Traffic (%)				46%								
Lane Group Flow (vph)	0	0	0	885	906	0	0	967	0	0	2233	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effct Green (s)				49.0	49.0			30.0			30.0	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio				0.54	0.54			0.33			0.33	
v/c Ratio				0.97	0.98			0.82			1.32	
Control Delay				44.3	46.8			34.5			175.4	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				44.3	46.8			34.5			175.4	
LOS				D	D			C			F	
Approach Delay				45.6				34.5			175.4	
Approach LOS				D				C			F	
Queue Length 50th (ft)				478	496			262			~606	
Queue Length 95th (ft)				#777	#797			341			#702	
Internal Link Dist (ft)		52			64			652			60	
Turn Bay Length (ft)												
Base Capacity (vph)				915	925			1179			1695	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.97	0.98			0.82			1.32	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.32

Intersection Signal Delay: 101.5

Intersection LOS: F

Intersection Capacity Utilization 94.3%

ICU Level of Service F

Analysis Period (min) 15

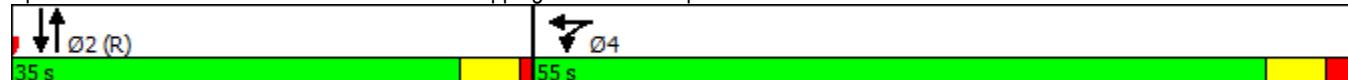
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

02/28/2020

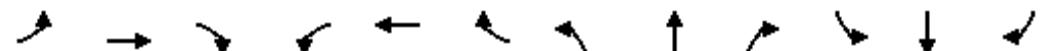


Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1508	140	0	0	890	0	0	2050	5
Future Volume (vph)	0	0	0	1508	140	0	0	890	0	0	2050	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1699			3539		5084	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1699			3539		5084	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	1639	152	0	0	967	0	0	2228	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	885	906	0	0	967	0	0	2233	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				49.0	49.0			30.0			30.0	
Effective Green, g (s)				49.0	49.0			30.0			30.0	
Actuated g/C Ratio				0.54	0.54			0.33			0.33	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				915	925			1179			1694	
v/s Ratio Prot				0.53	c0.53			0.27			c0.44	
v/s Ratio Perm												
v/c Ratio				0.97	0.98			0.82			1.32	
Uniform Delay, d1				19.7	20.0			27.5			30.0	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				21.9	24.3			6.4			147.5	
Delay (s)				41.6	44.3			34.0			177.5	
Level of Service				D	D			C			F	
Approach Delay (s)	0.0				43.0			34.0			177.5	
Approach LOS	A				D			C			F	
Intersection Summary												
HCM 2000 Control Delay				101.4				HCM 2000 Level of Service			F	
HCM 2000 Volume to Capacity ratio				1.11								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				94.3%				ICU Level of Service			F	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	311	15	5	10	382	1370	10	10	1015	70
Future Volume (vph)	50	10	311	15	5	10	382	1370	10	10	1015	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.897			0.999			0.990	
Flt Protected		0.960		0.950			0.950			0.950		
Satd. Flow (prot)	0	1788	1583	1770	1671	0	1770	3536	0	1770	3504	0
Flt Permitted		0.751		0.715			0.170			0.950		
Satd. Flow (perm)	0	1399	1583	1332	1671	0	317	3536	0	1770	3504	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		338			11			1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1428			412			717			433	
Travel Time (s)		32.5			9.4			16.3			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	338	16	5	11	415	1489	11	11	1103	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	338	16	16	0	415	1500	0	11	1179	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	10.5	10.5	10.5	10.5	10.5		68.2	68.2		6.2	48.5	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.76	0.76		0.07	0.54	
v/c Ratio	0.40	0.70	0.10	0.08			0.81	0.56		0.09	0.62	
Control Delay	42.3	12.4	34.1	20.5			34.9	7.2		40.5	17.0	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	42.3	12.4	34.1	20.5			34.9	7.2		40.5	17.0	
LOS	D	B	C	C			C	A		D	B	
Approach Delay	17.2				27.3				13.2			17.2
Approach LOS	B				C				B			B
Queue Length 50th (ft)	35	0	8	3			95	117		6	221	
Queue Length 95th (ft)	68	71	25	19		#327	388		22	353		
Internal Link Dist (ft)	1348				332				637			353
Turn Bay Length (ft)			200				150			300		
Base Capacity (vph)	326	628	310	398			514	2680		125	1891	
Starvation Cap Reductn	0	0	0	0			0	0		0	0	
Spillback Cap Reductn	0	0	0	0			0	0		0	0	
Storage Cap Reductn	0	0	0	0			0	0		0	0	
Reduced v/c Ratio	0.20	0.54	0.05	0.04			0.81	0.56		0.09	0.62	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 15.1

Intersection LOS: B

Intersection Capacity Utilization 73.1%

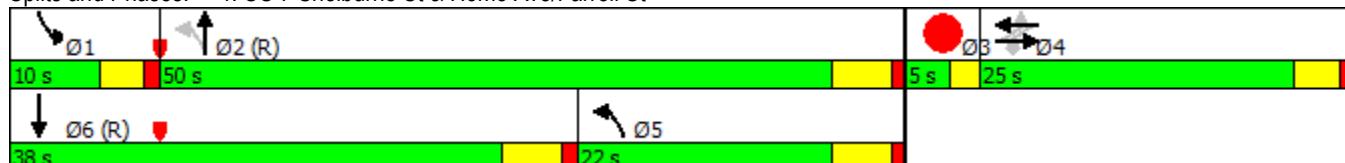
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
<u>Intersection Summary</u>	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	311	15	5	10	382	1370	10	10	1015	70
Future Volume (vph)	50	10	311	15	5	10	382	1370	10	10	1015	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95		
Frt	1.00	0.85	1.00	0.90			1.00	1.00	1.00	0.99		
Flt Protected	0.96	1.00	0.95	1.00			0.95	1.00	0.95	1.00		
Satd. Flow (prot)	1788	1583	1770	1671			1770	3535	1770	3505		
Flt Permitted	0.75	1.00	0.71	1.00			0.17	1.00	0.95	1.00		
Satd. Flow (perm)	1399	1583	1331	1671			317	3535	1770	3505		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	54	11	338	16	5	11	415	1489	11	11	1103	76
RTOR Reduction (vph)	0	0	299	0	10	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	65	39	16	6	0	415	1500	0	11	1175	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	10.5	10.5	10.5	10.5			65.0	65.0		1.5	45.3	
Effective Green, g (s)	10.5	10.5	10.5	10.5			65.0	65.0		1.5	45.3	
Actuated g/C Ratio	0.12	0.12	0.12	0.12			0.72	0.72		0.02	0.50	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	163	184	155	194			555	2553		29	1764	
v/s Ratio Prot				0.00			c0.17	0.42		0.01	c0.34	
v/s Ratio Perm	c0.05	0.02	0.01				c0.37					
v/c Ratio	0.40	0.21	0.10	0.03			0.75	0.59		0.38	0.67	
Uniform Delay, d1	36.8	36.0	35.5	35.2			17.1	6.0		43.8	16.7	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.6	0.3	0.1			5.5	1.0		8.1	2.0	
Delay (s)	38.4	36.6	35.8	35.3			22.5	7.0		51.9	18.7	
Level of Service	D	D	D	D			C	A		D	B	
Approach Delay (s)	36.9			35.6				10.4			19.0	
Approach LOS	D			D			B				B	

### Intersection Summary

HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	102	17	0	1596	1586	0	
Future Volume (vph)	102	17	0	1596	1586	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Fr <sub>t</sub>	0.997	0.850					
Flt Protected	0.953						
Satd. Flow (prot)	1770	1504	0	3539	3539	0	
Flt Permitted	0.953						
Satd. Flow (perm)	1770	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	1	16					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	111	18	0	1735	1724	0	
Shared Lane Traffic (%)	10%						
Lane Group Flow (vph)	113	16	0	1735	1724	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	
Total Split (s)	24.0	24.0		82.0	82.0	24.0	
Total Split (%)	18.5%	18.5%		63.1%	63.1%	18%	
Maximum Green (s)	18.0	18.0		76.0	76.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead			Lag		
Lead-Lag Optimize?	Yes	Yes			Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0	0.2	
Recall Mode	None	None		C-Max	C-Max	None	
Walk Time (s)	0.0	0.0		0.0	0.0	5.0	
Flash Dont Walk (s)	0.0	0.0		17.0	17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	
Act Effct Green (s)	12.6	12.6		105.4	105.4		

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Actuated g/C Ratio	0.10	0.10		0.81	0.81		
v/c Ratio	0.66	0.10		0.60	0.60		
Control Delay	73.3	22.1		6.0	6.0		
Queue Delay	0.0	0.0		0.0	4.3		
Total Delay	73.3	22.1		6.0	10.3		
LOS	E	C		A	B		
Approach Delay	66.9			6.0	10.3		
Approach LOS	E			A	B		
Queue Length 50th (ft)	93	0		231	228		
Queue Length 95th (ft)	152	24		352	347		
Internal Link Dist (ft)	258			305	166		
Turn Bay Length (ft)							
Base Capacity (vph)	245	222		2869	2869		
Starvation Cap Reductn	0	0		0	1052		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.46	0.07		0.60	0.95		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 10.3

Intersection LOS: B

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	102	17	0	1596	1586	0
Future Volume (vph)	102	17	0	1596	1586	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1771	1504		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1771	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	111	18	0	1735	1724	0
RTOR Reduction (vph)	1	14	0	0	0	0
Lane Group Flow (vph)	112	2	0	1735	1724	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	12.6	12.6		105.4	105.4	
Effective Green, g (s)	12.6	12.6		105.4	105.4	
Actuated g/C Ratio	0.10	0.10		0.81	0.81	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	171	145		2869	2869	
v/s Ratio Prot	c0.06	0.00		c0.49	0.49	
v/s Ratio Perm						
v/c Ratio	0.66	0.01		0.60	0.60	
Uniform Delay, d1	56.6	53.1		4.6	4.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.7	0.0		1.0	0.9	
Delay (s)	63.3	53.1		5.5	5.5	
Level of Service	E	D		A	A	
Approach Delay (s)	62.1			5.5	5.5	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay		7.5		HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio		0.62				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)		14.0
Intersection Capacity Utilization		60.1%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1292	50	0	0	965	0	0	1411	0
Future Volume (vph)	0	0	0	1292	50	0	0	965	0	0	1411	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Frt												
Flt Protected					0.950	0.956						
Satd. Flow (prot)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.956						
Satd. Flow (perm)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1404	54	0	0	1049	0	0	1534	0
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	730	728	0	0	1049	0	0	1534	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effct Green (s)				46.3	46.3			32.7			32.7	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

02/28/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio				0.51	0.51			0.36			0.36	
v/c Ratio				0.84	0.84			0.82			0.83	
Control Delay				29.1	28.4			33.3			31.9	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				29.1	28.4			33.3			31.9	
LOS				C	C			C			C	
Approach Delay					28.7			33.3			31.9	
Approach LOS					C			C			C	
Queue Length 50th (ft)				330	327			294			301	
Queue Length 95th (ft)				508	501			#413			#393	
Internal Link Dist (ft)		52			64			652			60	
Turn Bay Length (ft)												
Base Capacity (vph)				915	921			1287			1850	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.80	0.79			0.82			0.83	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 31.1

Intersection LOS: C

Intersection Capacity Utilization 73.5%

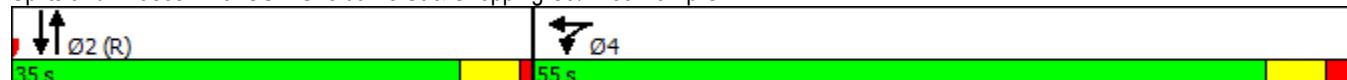
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

02/28/2020



Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1292	50	0	0	965	0	0	1411	0
Future Volume (vph)	0	0	0	1292	50	0	0	965	0	0	1411	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1691			3539		5085	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1691			3539		5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1404	54	0	0	1049	0	0	1534	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	730	728	0	0	1049	0	0	1534	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				46.3	46.3			32.7			32.7	
Effective Green, g (s)				46.3	46.3			32.7			32.7	
Actuated g/C Ratio				0.51	0.51			0.36			0.36	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				864	869			1285			1847	
v/s Ratio Prot				c0.43	0.43			0.30			c0.30	
v/s Ratio Perm												
v/c Ratio				0.84	0.84			0.82			0.83	
Uniform Delay, d1				18.8	18.6			25.9			26.1	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				7.6	7.1			5.8			4.5	
Delay (s)				26.4	25.7			31.7			30.6	
Level of Service				C	C			C			C	
Approach Delay (s)	0.0				26.1			31.7			30.6	
Approach LOS	A				C			C			C	
Intersection Summary												
HCM 2000 Control Delay				29.3				HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio				0.84								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				73.5%				ICU Level of Service			D	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	200	15	5	10	70	1060	10	10	645	50
Future Volume (vph)	50	10	200	15	5	10	70	1060	10	10	645	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.897			0.999			0.989	
Flt Protected		0.960		0.950			0.950			0.950		
Satd. Flow (prot)	0	1788	1583	1770	1671	0	1770	3536	0	1770	3500	0
Flt Permitted		0.751		0.715			0.360			0.950		
Satd. Flow (perm)	0	1399	1583	1332	1671	0	671	3536	0	1770	3500	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		217			11			1			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1428			412			717			433	
Travel Time (s)		32.5			9.4			16.3			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	217	16	5	11	76	1152	11	11	701	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	217	16	16	0	76	1163	0	11	755	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	9.6	9.6	9.6	9.6	9.6		69.1	69.1		6.2	53.8	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.77	0.77		0.07	0.60	
v/c Ratio	0.44	0.60	0.11	0.09			0.11	0.43		0.09	0.36	
Control Delay	45.8	12.6	36.2	22.0			4.9	5.2		40.5	11.6	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	45.8	12.6	36.2	22.0			4.9	5.2		40.5	11.6	
LOS	D	B	D	C			A	A		D	B	
Approach Delay	20.2				29.1			5.2			12.0	
Approach LOS	C				C			A			B	
Queue Length 50th (ft)	35	0	8	3			7	77		6	118	
Queue Length 95th (ft)	72	61	26	20			32	231		22	180	
Internal Link Dist (ft)	1348				332			637			353	
Turn Bay Length (ft)		200					150			300		
Base Capacity (vph)	326	535	310	398			723	2716		125	2096	
Starvation Cap Reductn	0	0	0	0			0	0		0	0	
Spillback Cap Reductn	0	0	0	0			0	0		0	0	
Storage Cap Reductn	0	0	0	0			0	0		0	0	
Reduced v/c Ratio	0.20	0.41	0.05	0.04			0.11	0.43		0.09	0.36	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 9.6

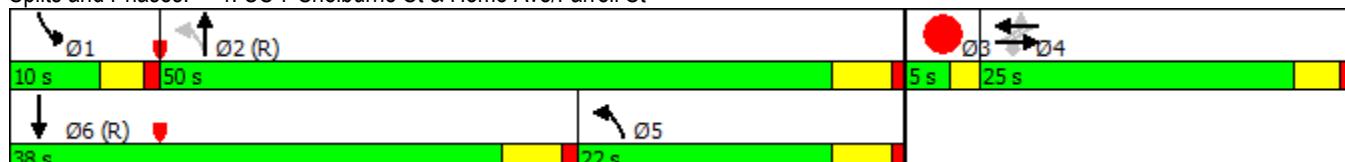
Intersection LOS: A

Intersection Capacity Utilization 53.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
<u>Intersection Summary</u>	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	200	15	5	10	70	1060	10	10	645	50
Future Volume (vph)	50	10	200	15	5	10	70	1060	10	10	645	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00			1.00	0.95		1.00	0.95	
Frt	1.00	0.85	1.00	0.90			1.00	1.00		1.00	0.99	
Flt Protected	0.96	1.00	0.95	1.00			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1788	1583	1770	1671			1770	3534		1770	3501	
Flt Permitted	0.75	1.00	0.71	1.00			0.36	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1583	1331	1671			671	3534		1770	3501	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	217	16	5	11	76	1152	11	11	701	54
RTOR Reduction (vph)	0	0	194	0	10	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	65	23	16	6	0	76	1163	0	11	751	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	9.6	9.6	9.6	9.6			65.9	65.9		1.5	50.6	
Effective Green, g (s)	9.6	9.6	9.6	9.6			65.9	65.9		1.5	50.6	
Actuated g/C Ratio	0.11	0.11	0.11	0.11			0.73	0.73		0.02	0.56	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	149	168	141	178			684	2587		29	1968	
v/s Ratio Prot				0.00			0.02	c0.33		0.01	c0.21	
v/s Ratio Perm	c0.05	0.01	0.01				0.06					
v/c Ratio	0.44	0.14	0.11	0.03			0.11	0.45		0.38	0.38	
Uniform Delay, d1	37.7	36.4	36.4	36.0			3.8	4.8		43.8	11.0	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.4	0.4	0.1			0.1	0.6		8.1	0.6	
Delay (s)	39.7	36.8	36.7	36.1			3.9	5.4		51.9	11.5	
Level of Service	D	D	D	D			A	A		D	B	
Approach Delay (s)	37.5			36.4				5.3			12.1	
Approach LOS	D			D			A				B	
Intersection Summary												
HCM 2000 Control Delay	11.9									B		
HCM 2000 Volume to Capacity ratio	0.47											
Actuated Cycle Length (s)	90.0									16.0		
Intersection Capacity Utilization	53.7%									A		
Analysis Period (min)	15											
c Critical Lane Group												

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	100	301	0	1523	1514	0	
Future Volume (vph)	100	301	0	1523	1514	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Frt	0.923	0.850					
Flt Protected	0.976						
Satd. Flow (prot)	1678	1504	0	3539	3539	0	
Flt Permitted	0.976						
Satd. Flow (perm)	1678	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	34	213					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	109	327	0	1655	1646	0	
Shared Lane Traffic (%)	35%						
Lane Group Flow (vph)	223	213	0	1655	1646	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	
Total Split (s)	24.0	24.0		82.0	82.0	24.0	
Total Split (%)	18.5%	18.5%		63.1%	63.1%	18%	
Maximum Green (s)	18.0	18.0		76.0	76.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead			Lag		
Lead-Lag Optimize?	Yes	Yes			Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0	0.2	
Recall Mode	None	None		C-Max	C-Max	None	
Walk Time (s)	0.0	0.0		0.0	0.0	5.0	
Flash Dont Walk (s)	0.0	0.0		17.0	17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	
Act Effect Green (s)	17.0	17.0		101.0	101.0		

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Actuated g/C Ratio	0.13	0.13		0.78	0.78		
v/c Ratio	0.90	0.56		0.60	0.60		
Control Delay	83.2	12.5		7.3	7.3		
Queue Delay	0.0	0.0		0.0	6.2		
Total Delay	83.2	12.5		7.3	13.5		
LOS	F	B		A	B		
Approach Delay	48.7			7.3	13.5		
Approach LOS	D			A	B		
Queue Length 50th (ft)	159	0		272	270		
Queue Length 95th (ft)	#301	77		323	320		
Internal Link Dist (ft)	258			305	166		
Turn Bay Length (ft)							
Base Capacity (vph)	261	391		2750	2750		
Starvation Cap Reductn	0	0		0	1048		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.85	0.54		0.60	0.97		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 14.8

Intersection LOS: B

Intersection Capacity Utilization 64.3%

ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	100	301	0	1523	1514	0
Future Volume (vph)	100	301	0	1523	1514	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	0.92	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	1679	1504		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	1679	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	327	0	1655	1646	0
RTOR Reduction (vph)	30	185	0	0	0	0
Lane Group Flow (vph)	193	28	0	1655	1646	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	17.0	17.0		101.0	101.0	
Effective Green, g (s)	17.0	17.0		101.0	101.0	
Actuated g/C Ratio	0.13	0.13		0.78	0.78	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	219	196		2749	2749	
v/s Ratio Prot	c0.12	0.02		c0.47	0.47	
v/s Ratio Perm						
v/c Ratio	0.88	0.14		0.60	0.60	
Uniform Delay, d1	55.5	50.0		6.1	6.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	30.8	0.1		1.0	1.0	
Delay (s)	86.3	50.2		7.1	7.0	
Level of Service	F	D		A	A	
Approach Delay (s)	68.6			7.1	7.0	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay		14.2		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.65				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		64.3%		ICU Level of Service	C	
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	80	106	40	5	5	137	515	40	5	625	40
Future Volume (vph)	50	80	106	40	5	5	137	515	40	5	625	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			75	0		0	125		0	100	0
Storage Lanes	0			1	0		0	1		0	1	0
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>				0.850		0.987			0.989			0.991
Flt Protected				0.981		0.961		0.950			0.950	
Satd. Flow (prot)	0	1827	1583	0	1767	0	1770	1842	0	1770	1846	0
Flt Permitted				0.874		0.515		0.950			0.950	
Satd. Flow (perm)	0	1628	1583	0	947	0	1770	1842	0	1770	1846	0
Right Turn on Red				Yes			Yes			Yes		Yes
Satd. Flow (RTOR)				110		4			4			4
Link Speed (mph)				30		30			30			30
Link Distance (ft)				335		128			357			349
Travel Time (s)				7.6		2.9			8.1			7.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	87	115	43	5	5	149	560	43	5	679	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	141	115	0	53	0	149	603	0	5	722	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)				0		0			12			12
Link Offset(ft)				0		0			0			0
Crosswalk Width(ft)				16		16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	15.0	15.0	15.0	15.0	15.0		11.0	20.0		11.0	20.5	
Total Split (s)	18.0	18.0	18.0	18.0	18.0		17.0	60.0		17.0	60.0	
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%		14.2%	50.0%		14.2%	50.0%	
Maximum Green (s)	13.0	13.0	13.0	13.0	13.0		12.0	55.0		12.0	55.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)												

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	21%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	12.4	12.4		12.4		11.7	70.3		5.9	55.6		
Actuated g/C Ratio	0.13	0.13		0.13		0.12	0.71		0.06	0.56		
v/c Ratio	0.69	0.39		0.43		0.71	0.46		0.05	0.70		
Control Delay	61.7	13.9		52.2		63.4	10.6		49.4	22.2		
Queue Delay	0.0	0.0		0.0		0.0	0.0		0.0	0.0		
Total Delay	61.7	13.9		52.2		63.4	10.6		49.4	22.2		
LOS	E	B		D		E	B		D	C		
Approach Delay	40.3			52.2			21.1			22.4		
Approach LOS	D			D			C			C		
Queue Length 50th (ft)	81	3		27		87	105		3	278		
Queue Length 95th (ft)	#217	60		#82		#233	462		17	#714		
Internal Link Dist (ft)	255			48			277			269		
Turn Bay Length (ft)	75				125				100			
Base Capacity (vph)	216	305		129		217	1311		217	1038		
Starvation Cap Reductn	0	0		0		0	0		0	0		
Spillback Cap Reductn	0	0		0		0	0		0	0		
Storage Cap Reductn	0	0		0		0	0		0	0		
Reduced v/c Ratio	0.65	0.38		0.41		0.69	0.46		0.02	0.70		

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 98.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 25.3

Intersection LOS: C

Intersection Capacity Utilization 64.9%

ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Champlain Pkwy & Home Ave



Lane Group	Ø9
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

7: Champlain Pkwy & Home Ave

04/23/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	80	106	40	5	5	137	515	40	5	625	40
Future Volume (vph)	50	80	106	40	5	5	137	515	40	5	625	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	0.99		1.00	0.99	
Flt Protected		0.98	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1828	1583		1767		1770	1843		1770	1846	
Flt Permitted		0.87	1.00		0.52		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1629	1583		948		1770	1843		1770	1846	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	87	115	43	5	5	149	560	43	5	679	43
RTOR Reduction (vph)	0	0	97	0	4	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	141	18	0	49	0	149	602	0	5	720	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	12.4	12.4		12.4		11.7	70.4		1.1	59.8		
Effective Green, g (s)	12.4	12.4		12.4		11.7	70.4		1.1	59.8		
Actuated g/C Ratio	0.12	0.12		0.12		0.11	0.67		0.01	0.57		
Clearance Time (s)	5.0	5.0		5.0		5.0	5.0		5.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	191	186		111		196	1229		18	1046		
v/s Ratio Prot					c0.08	0.33			0.00	c0.39		
v/s Ratio Perm	c0.09	0.01		0.05								
v/c Ratio	0.74	0.10		0.45		0.76	0.49		0.28	0.69		
Uniform Delay, d1	45.0	41.5		43.3		45.5	8.7		51.8	16.2		
Progression Factor	1.00	1.00		1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	13.8	0.2		2.8		15.8	1.4		8.3	3.7		
Delay (s)	58.8	41.8		46.2		61.4	10.1		60.1	19.9		
Level of Service	E	D		D		E	B		E	B		
Approach Delay (s)	51.2			46.2			20.2			20.2		
Approach LOS		D			D		C			C		
Intersection Summary												
HCM 2000 Control Delay		25.4			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.68										
Actuated Cycle Length (s)		105.5			Sum of lost time (s)			18.0				
Intersection Capacity Utilization		64.9%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1312	50	0	0	715	0	0	930	0
Future Volume (vph)	0	0	0	1312	50	0	0	715	0	0	930	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Frt												
Flt Protected					0.950	0.956						
Satd. Flow (prot)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.956						
Satd. Flow (perm)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1426	54	0	0	777	0	0	1011	0
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	742	738	0	0	777	0	0	1011	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effct Green (s)				46.5	46.5			32.5			32.5	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio				0.52	0.52			0.36			0.36	
v/c Ratio				0.85	0.84			0.61			0.55	
Control Delay				29.8	28.9			26.7			24.9	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				29.8	28.9			26.7			24.9	
LOS				C	C			C			C	
Approach Delay					29.3			26.7			24.9	
Approach LOS						C		C			C	
Queue Length 50th (ft)				340	335			196			173	
Queue Length 95th (ft)				#534	514			260			217	
Internal Link Dist (ft)		52				64			652		60	
Turn Bay Length (ft)												
Base Capacity (vph)				915	921			1278			1837	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.81	0.80			0.61			0.55	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 27.4

Intersection LOS: C

Intersection Capacity Utilization 71.8%

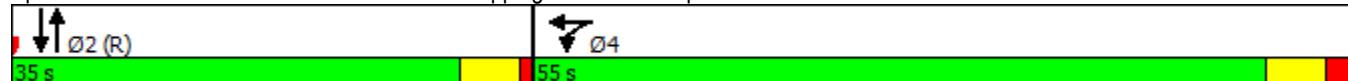
ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

04/23/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1312	50	0	0	715	0	0	930	0
Future Volume (vph)	0	0	0	1312	50	0	0	715	0	0	930	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1691			3539		5085	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1691			3539		5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1426	54	0	0	777	0	0	1011	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	742	738	0	0	777	0	0	1011	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				46.5	46.5			32.5			32.5	
Effective Green, g (s)				46.5	46.5			32.5			32.5	
Actuated g/C Ratio				0.52	0.52			0.36			0.36	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				868	873			1277			1836	
v/s Ratio Prot				c0.44	0.44			c0.22			0.20	
v/s Ratio Perm												
v/c Ratio				0.85	0.85			0.61			0.55	
Uniform Delay, d1				18.8	18.7			23.5			22.9	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				8.2	7.6			2.2			1.2	
Delay (s)				27.1	26.2			25.7			24.1	
Level of Service				C	C			C			C	
Approach Delay (s)	0.0				26.7			25.7			24.1	
Approach LOS	A				C			C			C	
Intersection Summary												
HCM 2000 Control Delay				25.6				HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio				0.75								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				71.8%				ICU Level of Service			C	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	25	142	30	20	35	168	1285	15	40	910	18
Future Volume (vph)	35	25	142	30	20	35	168	1285	15	40	910	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.905			0.998			0.997	
Flt Protected		0.972		0.950			0.950			0.950		
Satd. Flow (prot)	0	1811	1583	1770	1686	0	1770	3532	0	1770	3529	0
Flt Permitted		0.788		0.715			0.263			0.950		
Satd. Flow (perm)	0	1468	1583	1332	1686	0	490	3532	0	1770	3529	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		158		38			2			2		
Link Speed (mph)		30		30			30			30		
Link Distance (ft)		1428		412			717			433		
Travel Time (s)		32.5		9.4			16.3			9.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	27	154	33	22	38	183	1397	16	43	989	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	154	33	60	0	183	1413	0	43	1009	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16		16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	9.4	9.4	9.4	9.4	9.4		63.9	63.9		7.7	49.6	
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10		0.71	0.71		0.09	0.55	
v/c Ratio	0.42	0.50	0.24	0.29			0.31	0.56		0.28	0.52	
Control Delay	45.4	11.9	39.8	21.3			11.7	9.1		42.7	14.3	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	45.4	11.9	39.8	21.3			11.7	9.1		42.7	14.3	
LOS	D	B	D	C			B	A		D	B	
Approach Delay	21.8				27.9			9.4			15.5	
Approach LOS	C				C			A			B	
Queue Length 50th (ft)	35	0	18	12		34	203		23	175		
Queue Length 95th (ft)	72	50	44	46		75	339		54	258		
Internal Link Dist (ft)	1348			332			637			353		
Turn Bay Length (ft)		200				150			300			
Base Capacity (vph)	342	490	310	422		589	2509		153	1945		
Starvation Cap Reductn	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.19	0.31	0.11	0.14			0.31	0.56		0.28	0.52	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 13.0

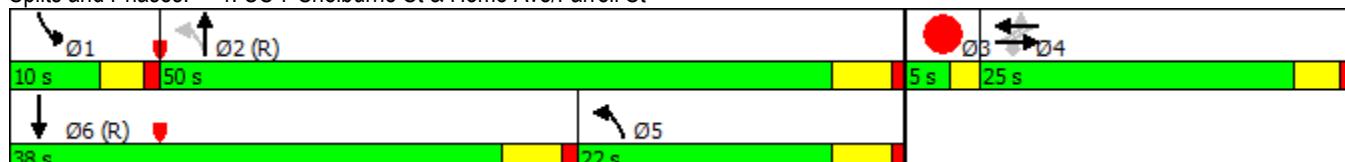
Intersection LOS: B

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
<u>Intersection Summary</u>	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

04/23/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	25	142	30	20	35	168	1285	15	40	910	18
Future Volume (vph)	35	25	142	30	20	35	168	1285	15	40	910	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95		
Frt	1.00	0.85	1.00	0.91			1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.97	1.00	0.95	1.00			0.95	1.00	0.95	1.00		
Satd. Flow (prot)	1810	1583	1770	1686			1770	3533	1770	3529		
Flt Permitted	0.79	1.00	0.71	1.00			0.26	1.00	0.95	1.00		
Satd. Flow (perm)	1467	1583	1331	1686			489	3533	1770	3529		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	38	27	154	33	22	38	183	1397	16	43	989	20
RTOR Reduction (vph)	0	0	138	0	34	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	65	16	33	26	0	183	1412	0	43	1008	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4				4		5	2		1	6
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	9.4	9.4	9.4	9.4			62.3	62.3		5.3	48.0	
Effective Green, g (s)	9.4	9.4	9.4	9.4			62.3	62.3		5.3	48.0	
Actuated g/C Ratio	0.10	0.10	0.10	0.10			0.69	0.69		0.06	0.53	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	153	165	139	176			603	2445		104	1882	
v/s Ratio Prot				0.02			0.06	c0.40		0.02	c0.29	
v/s Ratio Perm	c0.04	0.01	0.02				0.15					
v/c Ratio	0.42	0.10	0.24	0.15			0.30	0.58		0.41	0.54	
Uniform Delay, d1	37.8	36.5	37.0	36.7			8.1	7.1		40.9	13.7	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.3	0.9	0.4			0.3	1.0		2.7	1.1	
Delay (s)	39.7	36.7	37.9	37.0			8.4	8.1		43.5	14.8	
Level of Service	D	D	D	D			A	A		D	B	
Approach Delay (s)	37.6			37.3				8.1			16.0	
Approach LOS	D			D			A				B	

### Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	135	388	0	2055	1747	0	
Future Volume (vph)	135	388	0	2055	1747	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Frt	0.926	0.850					
Flt Protected	0.975						
Satd. Flow (prot)	1682	1504	0	3539	3539	0	
Flt Permitted	0.975						
Satd. Flow (perm)	1682	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	31	255					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	147	422	0	2234	1899	0	
Shared Lane Traffic (%)	34%						
Lane Group Flow (vph)	290	279	0	2234	1899	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	
Total Split (s)	24.0	24.0		82.0	82.0	24.0	
Total Split (%)	18.5%	18.5%		63.1%	63.1%	18%	
Maximum Green (s)	18.0	18.0		76.0	76.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead			Lag		
Lead-Lag Optimize?	Yes	Yes			Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0	0.2	
Recall Mode	None	None		C-Max	C-Max	None	
Walk Time (s)	0.0	0.0		0.0	0.0	5.0	
Flash Dont Walk (s)	0.0	0.0		17.0	17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	
Act Effect Green (s)	18.0	18.0		100.0	100.0		

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Actuated g/C Ratio	0.14	0.14		0.77	0.77		
v/c Ratio	1.12	0.65		0.82	0.70		
Control Delay	136.9	16.3		12.7	9.2		
Queue Delay	0.0	0.0		0.0	23.6		
Total Delay	136.9	16.3		12.7	32.7		
LOS	F	B		B	C		
Approach Delay	77.7			12.7	32.7		
Approach LOS	E			B	C		
Queue Length 50th (ft)	~257	18		532	360		
Queue Length 95th (ft)	#440	116		638	427		
Internal Link Dist (ft)	258			305	166		
Turn Bay Length (ft)							
Base Capacity (vph)	259	427		2722	2722		
Starvation Cap Reductn	0	0		0	897		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	1.12	0.65		0.82	1.04		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 28.7

Intersection LOS: C

Intersection Capacity Utilization 82.2%

ICU Level of Service E

Analysis Period (min) 15

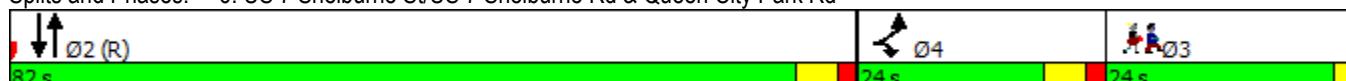
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	135	388	0	2055	1747	0
Future Volume (vph)	135	388	0	2055	1747	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	0.93	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	1682	1504		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	1682	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	422	0	2234	1899	0
RTOR Reduction (vph)	27	220	0	0	0	0
Lane Group Flow (vph)	263	59	0	2234	1899	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	18.0	18.0		100.0	100.0	
Effective Green, g (s)	18.0	18.0		100.0	100.0	
Actuated g/C Ratio	0.14	0.14		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	232	208		2722	2722	
v/s Ratio Prot	c0.16	0.04		c0.63	0.54	
v/s Ratio Perm						
v/c Ratio	1.13	0.29		0.82	0.70	
Uniform Delay, d1	56.0	50.2		9.4	7.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	100.2	0.3		2.9	1.5	
Delay (s)	156.2	50.5		12.3	9.0	
Level of Service	F	D		B	A	
Approach Delay (s)	104.4			12.3	9.0	
Approach LOS	F			B	A	
Intersection Summary						
HCM 2000 Control Delay		22.1		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		0.88				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		82.2%		ICU Level of Service	E	
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020

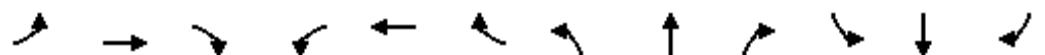


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	27	117	90	63	5	151	400	75	5	975	78
Future Volume (vph)	66	27	117	90	63	5	151	400	75	5	975	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	125		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>			0.850		0.996			0.976			0.989	
Flt Protected		0.966			0.972		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	1803	0	1770	1818	0	1770	1842	0
Flt Permitted		0.664			0.680		0.950			0.950		
Satd. Flow (perm)	0	1237	1583	0	1262	0	1770	1818	0	1770	1842	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		127			1			10			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		335			128			357			349	
Travel Time (s)		7.6			2.9			8.1			7.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	29	127	98	68	5	164	435	82	5	1060	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	101	127	0	171	0	164	517	0	5	1145	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	1.0	1.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	15.0	15.0	15.0	15.0	15.0		11.0	20.0		11.0	20.5	
Total Split (s)	23.0	23.0	23.0	23.0	23.0		16.0	86.0		16.0	86.0	
Total Split (%)	15.3%	15.3%	15.3%	15.3%	15.3%		10.7%	57.3%		10.7%	57.3%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		11.0	81.0		11.0	81.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)												

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	17%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	18.1	18.1		18.1		11.1	95.4		6.0	81.4		
Actuated g/C Ratio	0.14	0.14		0.14		0.09	0.73		0.05	0.63		
v/c Ratio	0.59	0.39		0.97		1.09	0.39		0.06	0.99		
Control Delay	68.8	12.7		116.2		155.2	9.5		64.8	49.1		
Queue Delay	0.0	0.0		0.0		0.0	0.0		0.0	0.0		
Total Delay	68.8	12.7		116.2		155.2	9.5		64.8	49.1		
LOS	E	B		F		F	A		E	D		
Approach Delay	37.5			116.2			44.6			49.2		
Approach LOS	D			F			D			D		
Queue Length 50th (ft)	77	0		138		~145	108		4	796		
Queue Length 95th (ft)	#182	63		#350		#355	388		20	#1583		
Internal Link Dist (ft)	255			48			277			269		
Turn Bay Length (ft)	75					125			100			
Base Capacity (vph)	172	329		176		150	1337		150	1155		
Starvation Cap Reductn	0	0		0		0	0		0	0		
Spillback Cap Reductn	0	0		0		0	0		0	0		
Storage Cap Reductn	0	0		0		0	0		0	0		
Reduced v/c Ratio	0.59	0.39		0.97		1.09	0.39		0.03	0.99		

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 130

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 51.7

Intersection LOS: D

Intersection Capacity Utilization 92.2%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Champlain Pkwy & Home Ave



Lane Group	Ø9
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

7: Champlain Pkwy & Home Ave

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	27	117	90	63	5	151	400	75	5	975	78
Future Volume (vph)	66	27	117	90	63	5	151	400	75	5	975	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00			1.00	0.98		1.00	0.99	
Flt Protected	0.97	1.00		0.97			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1799	1583		1804			1770	1818		1770	1842	
Flt Permitted	0.66	1.00		0.68			0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1237	1583		1262			1770	1818		1770	1842	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	29	127	98	68	5	164	435	82	5	1060	85
RTOR Reduction (vph)	0	0	110	0	1	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	101	17	0	170	0	164	514	0	5	1144	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	18.1	18.1		18.1			11.1	95.4		1.2	85.5	
Effective Green, g (s)	18.1	18.1		18.1			11.1	95.4		1.2	85.5	
Actuated g/C Ratio	0.13	0.13		0.13			0.08	0.70		0.01	0.63	
Clearance Time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	164	209		167			143	1270		15	1153	
v/s Ratio Prot					c0.09	0.28			0.00	c0.62		
v/s Ratio Perm	0.08	0.01		c0.13								
v/c Ratio	0.62	0.08		1.02			1.15	0.40		0.33	0.99	
Uniform Delay, d1	55.9	51.9		59.2			62.7	8.6		67.3	25.2	
Progression Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.7	0.2		74.6			120.2	1.0		12.7	24.6	
Delay (s)	62.6	52.1		133.8			182.9	9.6		79.9	49.8	
Level of Service	E	D		F			F	A		E	D	
Approach Delay (s)	56.7			133.8				51.3			49.9	
Approach LOS	E			F				D			D	
Intersection Summary												
HCM 2000 Control Delay	57.5			HCM 2000 Level of Service				E				
HCM 2000 Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	136.5			Sum of lost time (s)				18.0				
Intersection Capacity Utilization	92.2%			ICU Level of Service				F				
Analysis Period (min)	15											
c Critical Lane Group												

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1343	135	0	0	810	0	0	1381	5
Future Volume (vph)	0	0	0	1343	135	0	0	810	0	0	1381	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt												
Flt Protected					0.950	0.961						
Satd. Flow (prot)	0	0	0	1681	1701	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.961						
Satd. Flow (perm)	0	0	0	1681	1701	0	0	3539	0	0	5085	0
Right Turn on Red				Yes			Yes			Yes		Yes
Satd. Flow (RTOR)												1
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1460	147	0	0	880	0	0	1501	5
Shared Lane Traffic (%)				45%								
Lane Group Flow (vph)	0	0	0	803	804	0	0	880	0	0	1506	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effct Green (s)				47.8	47.8			31.2			31.2	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio				0.53	0.53			0.35			0.35	
v/c Ratio				0.90	0.89			0.72			0.85	
Control Delay				33.8	32.6			30.0			33.7	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				33.8	32.6			30.0			33.7	
LOS				C	C			C			C	
Approach Delay					33.2			30.0			33.7	
Approach LOS						C		C			C	
Queue Length 50th (ft)				393	390			231			293	
Queue Length 95th (ft)				#667	#662			303			#364	
Internal Link Dist (ft)		52				64			652			60
Turn Bay Length (ft)												
Base Capacity (vph)				915	926			1226			1763	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.88	0.87			0.72			0.85	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 32.7

Intersection LOS: C

Intersection Capacity Utilization 76.7%

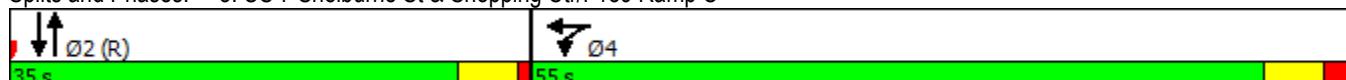
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

04/23/2020



Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1343	135	0	0	810	0	0	1381	5
Future Volume (vph)	0	0	0	1343	135	0	0	810	0	0	1381	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1700			3539		5083	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1700			3539		5083	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1460	147	0	0	880	0	0	1501	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	803	804	0	0	880	0	0	1505	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				47.8	47.8			31.2			31.2	
Effective Green, g (s)				47.8	47.8			31.2			31.2	
Actuated g/C Ratio				0.53	0.53			0.35			0.35	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				892	902			1226			1762	
v/s Ratio Prot				c0.48	0.47			0.25			c0.30	
v/s Ratio Perm												
v/c Ratio				0.90	0.89			0.72			0.85	
Uniform Delay, d1				19.0	18.8			25.6			27.3	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				12.1	11.0			3.6			5.5	
Delay (s)				31.0	29.8			29.2			32.8	
Level of Service				C	C			C			C	
Approach Delay (s)	0.0				30.4			29.2			32.8	
Approach LOS	A				C			C			C	
Intersection Summary												
HCM 2000 Control Delay				31.0				HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio				0.88								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				76.7%				ICU Level of Service			D	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	220	15	5	10	75	1050	10	10	735	50
Future Volume (vph)	50	10	220	15	5	10	75	1050	10	10	735	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.897			0.999			0.991	
Flt Protected		0.960		0.950			0.950			0.950		
Satd. Flow (prot)	0	1788	1583	1770	1671	0	1770	3536	0	1770	3507	0
Flt Permitted		0.751		0.715			0.314			0.950		
Satd. Flow (perm)	0	1399	1583	1332	1671	0	585	3536	0	1770	3507	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		239			11			1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1428			412			717			433	
Travel Time (s)		32.5			9.4			16.3			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	239	16	5	11	82	1141	11	11	799	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	239	16	16	0	82	1152	0	11	853	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	9.7	9.7	9.7	9.7	9.7		69.1	69.1		6.2	53.7	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.77	0.77		0.07	0.60	
v/c Ratio	0.43	0.62	0.11	0.08			0.13	0.42		0.09	0.41	
Control Delay	45.5	12.7	36.0	21.8			5.3	5.2		40.5	12.2	
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	45.5	12.7	36.0	21.8			5.3	5.2		40.5	12.2	
LOS	D	B	D	C			A	A		D	B	
Approach Delay	19.7			28.9				5.2			12.5	
Approach LOS	B			C			A				B	
Queue Length 50th (ft)	35	0	8	3			7	77		6	140	
Queue Length 95th (ft)	72	63	26	20			35	231		22	211	
Internal Link Dist (ft)	1348			332				637			353	
Turn Bay Length (ft)		200					150			300		
Base Capacity (vph)	326	552	310	398			672	2713		125	2096	
Starvation Cap Reductn	0	0	0	0			0	0		0	0	
Spillback Cap Reductn	0	0	0	0			0	0		0	0	
Storage Cap Reductn	0	0	0	0			0	0		0	0	
Reduced v/c Ratio	0.20	0.43	0.05	0.04			0.12	0.42		0.09	0.41	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 9.9

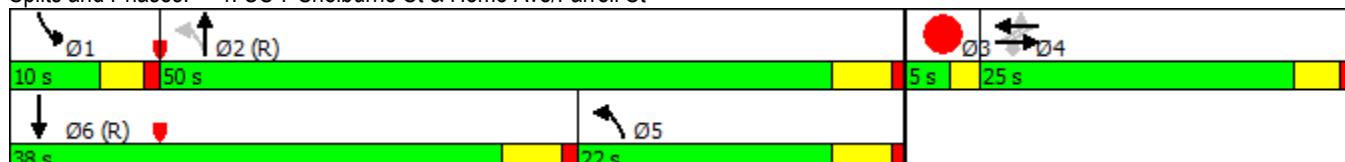
Intersection LOS: A

Intersection Capacity Utilization 53.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	220	15	5	10	75	1050	10	10	735	50
Future Volume (vph)	50	10	220	15	5	10	75	1050	10	10	735	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00			1.00	0.95		1.00	0.95	
Frt	1.00	0.85	1.00	0.90			1.00	1.00		1.00	0.99	
Flt Protected	0.96	1.00	0.95	1.00			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1788	1583	1770	1671			1770	3534		1770	3506	
Flt Permitted	0.75	1.00	0.71	1.00			0.31	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1583	1331	1671			585	3534		1770	3506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	239	16	5	11	82	1141	11	11	799	54
RTOR Reduction (vph)	0	0	213	0	10	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	65	26	16	6	0	82	1152	0	11	849	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	9.7	9.7	9.7	9.7			65.8	65.8		1.5	50.4	
Effective Green, g (s)	9.7	9.7	9.7	9.7			65.8	65.8		1.5	50.4	
Actuated g/C Ratio	0.11	0.11	0.11	0.11			0.73	0.73		0.02	0.56	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	150	170	143	180			637	2583		29	1963	
v/s Ratio Prot				0.00			0.02	c0.33		0.01	c0.24	
v/s Ratio Perm	c0.05	0.02	0.01				0.07					
v/c Ratio	0.43	0.15	0.11	0.03			0.13	0.45		0.38	0.43	
Uniform Delay, d1	37.6	36.4	36.3	36.0			4.6	4.8		43.8	11.5	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.4	0.3	0.1			0.1	0.6		8.1	0.7	
Delay (s)	39.6	36.8	36.6	36.0			4.7	5.4		51.9	12.2	
Level of Service	D	D	D	D			A	A		D	B	
Approach Delay (s)	37.4			36.3				5.3			12.7	
Approach LOS	D			D			A				B	
Intersection Summary												
HCM 2000 Control Delay	12.4									B		
HCM 2000 Volume to Capacity ratio	0.47											
Actuated Cycle Length (s)	90.0									16.0		
Intersection Capacity Utilization	53.5%									A		
Analysis Period (min)	15											
c Critical Lane Group												

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	105	311	0	1596	1586	0	
Future Volume (vph)	105	311	0	1596	1586	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Frt	0.924	0.850					
Flt Protected	0.976						
Satd. Flow (prot)	1680	1504	0	3539	3539	0	
Flt Permitted	0.976						
Satd. Flow (perm)	1680	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	33	220					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	114	338	0	1735	1724	0	
Shared Lane Traffic (%)	35%						
Lane Group Flow (vph)	232	220	0	1735	1724	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	
Total Split (s)	24.0	24.0		82.0	82.0	24.0	
Total Split (%)	18.5%	18.5%		63.1%	63.1%	18%	
Maximum Green (s)	18.0	18.0		76.0	76.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead			Lag		
Lead-Lag Optimize?	Yes	Yes			Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0	0.2	
Recall Mode	None	None		C-Max	C-Max	None	
Walk Time (s)	0.0	0.0		0.0	0.0	5.0	
Flash Dont Walk (s)	0.0	0.0		17.0	17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	
Act Effect Green (s)	17.2	17.2		100.8	100.8		

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Actuated g/C Ratio	0.13	0.13		0.78	0.78		
v/c Ratio	0.92	0.56		0.63	0.63		
Control Delay	87.7	12.4		7.8	7.8		
Queue Delay	0.0	0.0		0.0	9.3		
Total Delay	87.7	12.4		7.8	17.1		
LOS	F	B		A	B		
Approach Delay	51.0			7.8	17.1		
Approach LOS	D			A	B		
Queue Length 50th (ft)	168	0		298	295		
Queue Length 95th (ft)	#322	78		354	350		
Internal Link Dist (ft)	258			305	166		
Turn Bay Length (ft)							
Base Capacity (vph)	261	397		2743	2743		
Starvation Cap Reductn	0	0		0	1001		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.89	0.55		0.63	0.99		

## Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 16.9

Intersection LOS: B

Intersection Capacity Utilization 66.7%

ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	105	311	0	1596	1586	0
Future Volume (vph)	105	311	0	1596	1586	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	0.92	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	1679	1504		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	1679	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	338	0	1735	1724	0
RTOR Reduction (vph)	29	191	0	0	0	0
Lane Group Flow (vph)	203	29	0	1735	1724	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	17.2	17.2		100.8	100.8	
Effective Green, g (s)	17.2	17.2		100.8	100.8	
Actuated g/C Ratio	0.13	0.13		0.78	0.78	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	222	198		2744	2744	
v/s Ratio Prot	c0.12	0.02		c0.49	0.49	
v/s Ratio Perm						
v/c Ratio	0.92	0.15		0.63	0.63	
Uniform Delay, d1	55.7	49.9		6.4	6.4	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	37.3	0.1		1.1	1.1	
Delay (s)	93.0	50.0		7.6	7.5	
Level of Service	F	D		A	A	
Approach Delay (s)	72.1			7.6	7.5	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay		15.0		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.69				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		66.7%		ICU Level of Service	C	
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	85	116	50	5	5	162	530	40	5	655	50
Future Volume (vph)	60	85	116	50	5	5	162	530	40	5	655	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	125		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>			0.850		0.989			0.990			0.989	
Flt Protected		0.980			0.960		0.950			0.950		
Satd. Flow (prot)	0	1825	1583	0	1769	0	1770	1844	0	1770	1842	0
Flt Permitted		0.862			0.456		0.950			0.950		
Satd. Flow (perm)	0	1606	1583	0	840	0	1770	1844	0	1770	1842	0
Right Turn on Red		Yes				Yes			Yes			Yes
Satd. Flow (RTOR)		108			3			4			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		335			128			357			349	
Travel Time (s)		7.6			2.9			8.1			7.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	92	126	54	5	5	176	576	43	5	712	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	157	126	0	64	0	176	619	0	5	766	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	15.0	15.0	15.0	15.0	15.0		11.0	20.0		11.0	20.0	
Total Split (s)	18.0	18.0	18.0	18.0	18.0		18.0	59.0		18.0	59.0	
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%		15.0%	49.2%		15.0%	49.2%	
Maximum Green (s)	13.0	13.0	13.0	13.0	13.0		13.0	54.0		13.0	54.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)												

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	21%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	12.9	12.9		12.9		13.1	70.7		5.9	54.5		
Actuated g/C Ratio	0.13	0.13		0.13		0.13	0.71		0.06	0.55		
v/c Ratio	0.76	0.42		0.58		0.76	0.47		0.05	0.76		
Control Delay	66.7	16.6		63.3		64.9	10.9		49.4	25.5		
Queue Delay	0.0	0.0		0.0		0.0	0.0		0.0	0.0		
Total Delay	66.7	16.6		63.3		64.9	10.9		49.4	25.5		
LOS	E	B		E		E	B		D	C		
Approach Delay	44.4			63.3			22.9			25.6		
Approach LOS	D			E			C			C		
Queue Length 50th (ft)	92	10		35		103	109		3	317		
Queue Length 95th (ft)	#251	72		#120		#274	480		17	#804		
Internal Link Dist (ft)	255			48			277			269		
Turn Bay Length (ft)	75					125			100			
Base Capacity (vph)	210	301		113		232	1306		232	1007		
Starvation Cap Reductn	0	0		0		0	0		0	0		
Spillback Cap Reductn	0	0		0		0	0		0	0		
Storage Cap Reductn	0	0		0		0	0		0	0		
Reduced v/c Ratio	0.75	0.42		0.57		0.76	0.47		0.02	0.76		

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 99.8

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 28.5

Intersection LOS: C

Intersection Capacity Utilization 69.0%

ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Champlain Pkwy & Home Ave



Lane Group	Ø9
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

7: Champlain Pkwy & Home Ave

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	85	116	50	5	5	162	530	40	5	655	50
Future Volume (vph)	60	85	116	50	5	5	162	530	40	5	655	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Frt	1.00	0.85		0.99			1.00	0.99		1.00	0.99	
Flt Protected	0.98	1.00		0.96			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1583		1768			1770	1843		1770	1843	
Flt Permitted	0.86	1.00		0.46			0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1605	1583		840			1770	1843		1770	1843	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	92	126	54	5	5	176	576	43	5	712	54
RTOR Reduction (vph)	0	0	95	0	3	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	157	31	0	61	0	176	618	0	5	764	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4				8		5	2		1	6
Permitted Phases	4		4		8							
Actuated Green, G (s)	12.9	12.9		12.9			13.1	70.6		1.1	58.6	
Effective Green, g (s)	12.9	12.9		12.9			13.1	70.6		1.1	58.6	
Actuated g/C Ratio	0.12	0.12		0.12			0.12	0.66		0.01	0.55	
Clearance Time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	194	192		101			218	1224		18	1015	
v/s Ratio Prot					c0.10	0.34				0.00	c0.41	
v/s Ratio Perm	c0.10	0.02		0.07								
v/c Ratio	0.81	0.16		0.61			0.81	0.50		0.28	0.75	
Uniform Delay, d1	45.5	41.9		44.3			45.4	9.0		52.2	18.3	
Progression Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.4	0.4		9.9			19.3	1.5		8.3	5.2	
Delay (s)	66.9	42.3		54.2			64.6	10.5		60.5	23.5	
Level of Service	E	D		D			E	B		E	C	
Approach Delay (s)	55.9			54.2				22.5			23.7	
Approach LOS	E			D			C				C	
Intersection Summary												
HCM 2000 Control Delay	29.0				HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	106.3				Sum of lost time (s)					18.0		
Intersection Capacity Utilization	69.0%				ICU Level of Service					C		
Analysis Period (min)	15											
c Critical Lane Group												

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1287	50	0	0	780	0	0	1045	0
Future Volume (vph)	0	0	0	1287	50	0	0	780	0	0	1045	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Frt												
Flt Protected					0.950	0.956						
Satd. Flow (prot)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.956						
Satd. Flow (perm)	0	0	0	1681	1692	0	0	3539	0	0	5085	0
Right Turn on Red				Yes			Yes			Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1399	54	0	0	848	0	0	1136	0
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	727	726	0	0	848	0	0	1136	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effct Green (s)				46.2	46.2			32.8			32.8	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio				0.51	0.51			0.36			0.36	
v/c Ratio				0.84	0.84			0.66			0.61	
Control Delay				28.9	28.3			27.7			25.8	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				28.9	28.3			27.7			25.8	
LOS				C	C			C			C	
Approach Delay					28.6			27.7			25.8	
Approach LOS						C		C			C	
Queue Length 50th (ft)				328	325			220			201	
Queue Length 95th (ft)				504	497			288			249	
Internal Link Dist (ft)		52				64			652			60
Turn Bay Length (ft)												
Base Capacity (vph)				915	921			1290			1854	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.79	0.79			0.66			0.61	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 27.5

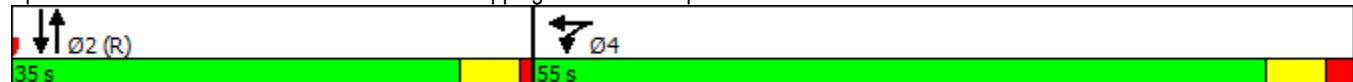
Intersection LOS: C

Intersection Capacity Utilization 71.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

04/23/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1287	50	0	0	780	0	0	1045	0
Future Volume (vph)	0	0	0	1287	50	0	0	780	0	0	1045	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1691			3539		5085	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1691			3539		5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1399	54	0	0	848	0	0	1136	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	727	726	0	0	848	0	0	1136	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				46.2	46.2			32.8			32.8	
Effective Green, g (s)				46.2	46.2			32.8			32.8	
Actuated g/C Ratio				0.51	0.51			0.36			0.36	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				862	868			1289			1853	
v/s Ratio Prot				c0.43	0.43			c0.24			0.22	
v/s Ratio Perm												
v/c Ratio				0.84	0.84			0.66			0.61	
Uniform Delay, d1				18.8	18.7			23.9			23.4	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				7.6	7.0			2.6			1.5	
Delay (s)				26.4	25.7			26.5			24.9	
Level of Service				C	C			C			C	
Approach Delay (s)	0.0				26.0			26.5			24.9	
Approach LOS	A				C			C			C	
Intersection Summary												
HCM 2000 Control Delay				25.8				HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio				0.77								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				71.1%				ICU Level of Service			C	
Analysis Period (min)				15								
c Critical Lane Group												

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	25	157	30	20	25	183	1295	15	40	935	18
Future Volume (vph)	35	25	157	30	20	25	183	1295	15	40	935	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	150		0	300		0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.917			0.998			0.997	
Flt Protected		0.972		0.950			0.950			0.950		
Satd. Flow (prot)	0	1811	1583	1770	1708	0	1770	3532	0	1770	3529	0
Flt Permitted		0.794		0.715			0.252			0.950		
Satd. Flow (perm)	0	1479	1583	1332	1708	0	469	3532	0	1770	3529	0
Right Turn on Red		Yes			Yes				Yes			Yes
Satd. Flow (RTOR)		171			27			2			2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1428			412			717			433	
Travel Time (s)		32.5			9.4			16.3			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	27	171	33	22	27	199	1408	16	43	1016	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	171	33	49	0	199	1424	0	43	1036	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		22.0	30.0		8.0	30.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		22.0	50.0		10.0	38.0	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		24.4%	55.6%		11.1%	42.2%	
Maximum Green (s)	21.0	21.0	21.0	21.0	21.0		17.0	45.0		6.0	33.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			10.0			10.0	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	2.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	

## Lanes, Volumes, Timings

4: US 7 Shelburne St &amp; Home Ave/Farrell St

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	12.0			15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	9.4	9.4	9.4	9.4	9.4		63.9	63.9		7.7	49.6	
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10		0.71	0.71		0.09	0.55	
v/c Ratio	0.42	0.54	0.24	0.24	0.24		0.34	0.57		0.28	0.53	
Control Delay	45.2	12.6	39.9	23.1	23.1		12.8	9.1		42.7	14.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	45.2	12.6	39.9	23.1	23.1		12.8	9.1		42.7	14.5	
LOS	D	B	D	C			B	A		D	B	
Approach Delay	21.6			29.8				9.6			15.6	
Approach LOS	C			C				A			B	
Queue Length 50th (ft)	35	0	18	12		37	206		23	182		
Queue Length 95th (ft)	72	55	44	43		81	342		54	267		
Internal Link Dist (ft)	1348			332				637			353	
Turn Bay Length (ft)		200				150			300			
Base Capacity (vph)	345	500	310	419		578	2509		153	1946		
Starvation Cap Reductn	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.19	0.34	0.11	0.12			0.34	0.57		0.28	0.53	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 13.2

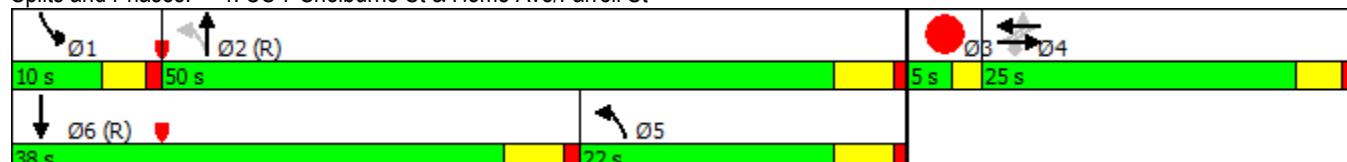
Intersection LOS: B

Intersection Capacity Utilization 60.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: US 7 Shelburne St &amp; Home Ave/Farrell St



Lane Group	Ø3
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

## 4: US 7 Shelburne St & Home Ave/Farrell St

04/23/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	25	157	30	20	25	183	1295	15	40	935	18
Future Volume (vph)	35	25	157	30	20	25	183	1295	15	40	935	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00			1.00	0.95		1.00	0.95	
Frt	1.00	0.85	1.00	0.92			1.00	1.00		1.00	1.00	
Flt Protected	0.97	1.00	0.95	1.00			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1810	1583	1770	1709			1770	3533		1770	3529	
Flt Permitted	0.79	1.00	0.71	1.00			0.25	1.00		0.95	1.00	
Satd. Flow (perm)	1479	1583	1331	1709			468	3533		1770	3529	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	27	171	33	22	27	199	1408	16	43	1016	20
RTOR Reduction (vph)	0	0	153	0	24	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	65	18	33	25	0	199	1423	0	43	1035	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4			2					
Actuated Green, G (s)	9.4	9.4	9.4	9.4			62.3	62.3		5.3	48.0	
Effective Green, g (s)	9.4	9.4	9.4	9.4			62.3	62.3		5.3	48.0	
Actuated g/C Ratio	0.10	0.10	0.10	0.10			0.69	0.69		0.06	0.53	
Clearance Time (s)	4.0	4.0	4.0	4.0			5.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	154	165	139	178			593	2445		104	1882	
v/s Ratio Prot				0.01			0.07	c0.40		0.02	c0.29	
v/s Ratio Perm	c0.04	0.01	0.02				0.16					
v/c Ratio	0.42	0.11	0.24	0.14			0.34	0.58		0.41	0.55	
Uniform Delay, d1	37.8	36.5	37.0	36.6			9.1	7.1		40.9	13.9	
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.3	0.9	0.4			0.3	1.0		2.7	1.2	
Delay (s)	39.6	36.8	37.9	37.0			9.4	8.2		43.5	15.0	
Level of Service	D	D	D	D			A	A		D	B	
Approach Delay (s)	37.6			37.4				8.3			16.2	
Approach LOS	D			D			A				B	
Intersection Summary												
HCM 2000 Control Delay	14.2									B		
HCM 2000 Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	90.0									16.0		
Intersection Capacity Utilization	60.4%									B		
Analysis Period (min)	15											
c Critical Lane Group												

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd &amp; Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	160	403	0	2386	2029	0	
Future Volume (vph)	160	403	0	2386	2029	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	
Fr <sub>t</sub>	0.933	0.850					
Flt Protected	0.973						
Satd. Flow (prot)	1691	1504	0	3539	3539	0	
Flt Permitted	0.973						
Satd. Flow (perm)	1691	1504	0	3539	3539	0	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)	26	249					
Link Speed (mph)	30			30	30		
Link Distance (ft)	338			385	246		
Travel Time (s)	7.7			8.8	5.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	174	438	0	2593	2205	0	
Shared Lane Traffic (%)		32%					
Lane Group Flow (vph)	314	298	0	2593	2205	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot		NA	NA		
Protected Phases	4	4		2	2	3	
Permitted Phases							
Detector Phase	4	4		2	2		
Switch Phase							
Minimum Initial (s)	5.0	5.0		5.0	5.0	1.0	
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	
Total Split (s)	24.0	24.0		82.0	82.0	24.0	
Total Split (%)	18.5%	18.5%		63.1%	63.1%	18%	
Maximum Green (s)	18.0	18.0		76.0	76.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0		
Lead/Lag	Lead	Lead			Lag		
Lead-Lag Optimize?	Yes	Yes			Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0	0.2	
Recall Mode	None	None		C-Max	C-Max	None	
Walk Time (s)	0.0	0.0		0.0	0.0	5.0	
Flash Dont Walk (s)	0.0	0.0		17.0	17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	
Act Effct Green (s)	18.0	18.0		100.0	100.0		

## Lanes, Volumes, Timings

6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Actuated g/C Ratio	0.14	0.14		0.77	0.77		
v/c Ratio	1.23	0.71		0.95	0.81		
Control Delay	173.9	20.8		23.0	12.3		
Queue Delay	0.0	0.0		0.0	46.1		
Total Delay	173.9	20.8		23.0	58.5		
LOS	F	C		C	E		
Approach Delay	99.3			23.0	58.5		
Approach LOS	F			C	E		
Queue Length 50th (ft)	~307	38		852	513		
Queue Length 95th (ft)	#495	147		#1067	614		
Internal Link Dist (ft)	258			305	166		
Turn Bay Length (ft)							
Base Capacity (vph)	256	422		2722	2722		
Starvation Cap Reductn	0	0		0	714		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	1.23	0.71		0.95	1.10		

### Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.23

Intersection Signal Delay: 46.1

Intersection LOS: D

Intersection Capacity Utilization 93.0%

ICU Level of Service F

Analysis Period (min) 15

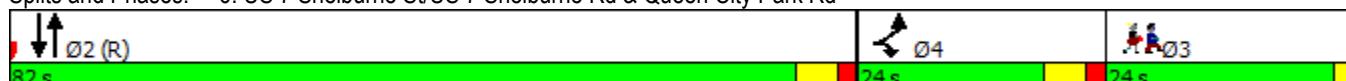
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd



HCM Signalized Intersection Capacity Analysis  
6: US 7 Shelburne St/US 7 Shelburne Rd & Queen City Park Rd

04/23/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	160	403	0	2386	2029	0
Future Volume (vph)	160	403	0	2386	2029	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	
Frt	0.93	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	1691	1504		3539	3539	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	1691	1504		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	438	0	2593	2205	0
RTOR Reduction (vph)	22	215	0	0	0	0
Lane Group Flow (vph)	292	83	0	2593	2205	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	18.0	18.0		100.0	100.0	
Effective Green, g (s)	18.0	18.0		100.0	100.0	
Actuated g/C Ratio	0.14	0.14		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	234	208		2722	2722	
v/s Ratio Prot	c0.17	0.06		c0.73	0.62	
v/s Ratio Perm						
v/c Ratio	1.25	0.40		0.95	0.81	
Uniform Delay, d1	56.0	51.1		13.0	9.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	141.3	0.5		9.3	2.7	
Delay (s)	197.3	51.5		22.2	11.9	
Level of Service	F	D		C	B	
Approach Delay (s)	126.3			22.2	11.9	
Approach LOS	F			C	B	
Intersection Summary						
HCM 2000 Control Delay		29.8		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		1.01				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)	14.0	
Intersection Capacity Utilization		93.0%		ICU Level of Service	F	
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	22	142	95	63	5	171	395	85	5	965	88
Future Volume (vph)	86	22	142	95	63	5	171	395	85	5	965	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	125		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996			0.974				0.987
Flt Protected			0.962			0.972		0.950			0.950	
Satd. Flow (prot)	0	1792	1583	0	1803	0	1770	1814	0	1770	1839	0
Flt Permitted			0.647			0.629		0.950			0.950	
Satd. Flow (perm)	0	1205	1583	0	1167	0	1770	1814	0	1770	1839	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			1			11			5
Link Speed (mph)			30			30			30			30
Link Distance (ft)			335			128			357			349
Travel Time (s)			7.6			2.9			8.1			7.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	24	154	103	68	5	186	429	92	5	1049	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	154	0	176	0	186	521	0	5	1145	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)			0			0			12			12
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	15.0	15.0	15.0	15.0	15.0		11.0	20.0		11.0	20.5	
Total Split (s)	24.0	24.0	24.0	24.0	24.0		18.0	83.0		18.0	83.0	
Total Split (%)	16.0%	16.0%	16.0%	16.0%	16.0%		12.0%	55.3%		12.0%	55.3%	
Maximum Green (s)	19.0	19.0	19.0	19.0	19.0		13.0	78.0		13.0	78.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0			0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)												

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	17%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0

Lanes, Volumes, Timings  
7: Champlain Pkwy & Home Ave

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	19.1	19.1		19.1		13.1	94.4		6.0	78.4		
Actuated g/C Ratio	0.15	0.15		0.15		0.10	0.73		0.05	0.60		
v/c Ratio	0.66	0.43		1.02		1.04	0.39		0.06	1.03		
Control Delay	72.2	14.0		128.8		135.9	10.0		64.8	61.5		
Queue Delay	0.0	0.0		0.0		0.0	0.0		0.0	0.0		
Total Delay	72.2	14.0		128.8		135.9	10.0		64.8	61.5		
LOS	E	B		F		F	A		E	E		
Approach Delay	39.1			128.8			43.1			61.5		
Approach LOS	D			F			D			E		
Queue Length 50th (ft)	90	6		143		~155	114		4	861		
Queue Length 95th (ft)	#218	78		#369		#384	400		20	#1622		
Internal Link Dist (ft)	255			48			277			269		
Turn Bay Length (ft)	75					125			100			
Base Capacity (vph)	177	356		172		178	1320		178	1111		
Starvation Cap Reductn	0	0		0		0	0		0	0		
Spillback Cap Reductn	0	0		0		0	0		0	0		
Storage Cap Reductn	0	0		0		0	0		0	0		
Reduced v/c Ratio	0.66	0.43		1.02		1.04	0.39		0.03	1.03		

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 130

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 58.4

Intersection LOS: E

Intersection Capacity Utilization 93.6%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Champlain Pkwy & Home Ave



Lane Group	Ø9
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# HCM Signalized Intersection Capacity Analysis

7: Champlain Pkwy & Home Ave

04/23/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	22	142	95	63	5	171	395	85	5	965	88
Future Volume (vph)	86	22	142	95	63	5	171	395	85	5	965	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00			1.00	0.97		1.00	0.99	
Flt Protected	0.96	1.00		0.97			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1792	1583		1803			1770	1813		1770	1839	
Flt Permitted	0.65	1.00		0.63			0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1204	1583		1168			1770	1813		1770	1839	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	24	154	103	68	5	186	429	92	5	1049	96
RTOR Reduction (vph)	0	0	125	0	1	0	0	3	0	0	2	0
Lane Group Flow (vph)	0	117	29	0	175	0	186	518	0	5	1143	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4				8			5	2		1
Permitted Phases	4		4		8							
Actuated Green, G (s)	19.1	19.1		19.1			13.1	94.4		1.2	82.5	
Effective Green, g (s)	19.1	19.1		19.1			13.1	94.4		1.2	82.5	
Actuated g/C Ratio	0.14	0.14		0.14			0.10	0.69		0.01	0.60	
Clearance Time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	168	221		163			169	1253		15	1111	
v/s Ratio Prot						c0.11	0.29			0.00	c0.62	
v/s Ratio Perm	0.10	0.02		c0.15								
v/c Ratio	0.70	0.13		1.07			1.10	0.41		0.33	1.03	
Uniform Delay, d1	55.9	51.4		58.7			61.7	9.1		67.3	27.0	
Progression Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.9	0.3		91.7			98.7	1.0		12.7	34.6	
Delay (s)	67.8	51.7		150.4			160.4	10.1		79.9	61.6	
Level of Service	E	D		F			F	B		E	E	
Approach Delay (s)	58.7			150.4				49.6			61.7	
Approach LOS	E			F				D			E	

## Intersection Summary

HCM 2000 Control Delay	64.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	136.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1478	135	0	0	795	0	0	1432	5
Future Volume (vph)	0	0	0	1478	135	0	0	795	0	0	1432	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt												
Flt Protected					0.950	0.960						
Satd. Flow (prot)	0	0	0	1681	1699	0	0	3539	0	0	5085	0
Flt Permitted					0.950	0.960						
Satd. Flow (perm)	0	0	0	1681	1699	0	0	3539	0	0	5085	0
Right Turn on Red				Yes			Yes			Yes		Yes
Satd. Flow (RTOR)												1
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		132			144			732			140	
Travel Time (s)		3.0			3.3			16.6			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1607	147	0	0	864	0	0	1557	5
Shared Lane Traffic (%)				46%								
Lane Group Flow (vph)	0	0	0	868	886	0	0	864	0	0	1562	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Detector Phase				4	4			2			2	
Switch Phase												
Minimum Initial (s)				15.0	15.0			30.0			30.0	
Minimum Split (s)				24.0	24.0			35.0			35.0	
Total Split (s)				55.0	55.0			35.0			35.0	
Total Split (%)				61.1%	61.1%			38.9%			38.9%	
Maximum Green (s)				49.0	49.0			30.0			30.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				6.0	6.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	None			C-Max			C-Max	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effct Green (s)				49.0	49.0			30.0			30.0	

## Lanes, Volumes, Timings

8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C

04/23/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio				0.54	0.54			0.33			0.33	
v/c Ratio				0.95	0.96			0.73			0.92	
Control Delay				40.7	42.3			30.9			39.3	
Queue Delay				0.0	0.0			0.0			0.0	
Total Delay				40.7	42.3			30.9			39.3	
LOS				D	D			C			D	
Approach Delay					41.5			30.9			39.3	
Approach LOS					D			C			D	
Queue Length 50th (ft)				460	473			225			309	
Queue Length 95th (ft)				#755	#771			296			#406	
Internal Link Dist (ft)		52			64			652			60	
Turn Bay Length (ft)												
Base Capacity (vph)				915	925			1179			1695	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.95	0.96			0.73			0.92	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NSSB and 6:, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 38.5

Intersection LOS: D

Intersection Capacity Utilization 81.4%

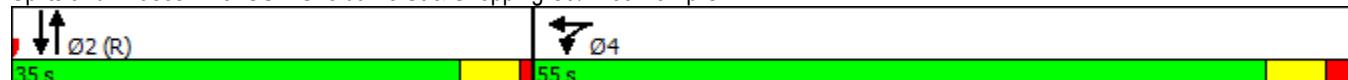
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: US 7 Shelburne St &amp; Shopping Ctr/I-189 Ramp C



HCM Signalized Intersection Capacity Analysis  
8: US 7 Shelburne St & Shopping Ctr/I-189 Ramp C

04/23/2020

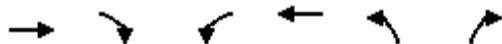


Movement	EBL	EBT	EBC	WBL	WBT	WBC	NBL	NBT	NBC	SBL	SBT	SBC
Lane Configurations												
Traffic Volume (vph)	0	0	0	1478	135	0	0	795	0	0	1432	5
Future Volume (vph)	0	0	0	1478	135	0	0	795	0	0	1432	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			5.0			5.0	
Lane Util. Factor				0.95	0.95			0.95			0.91	
Frt					1.00	1.00			1.00		1.00	
Flt Protected					0.95	0.96			1.00		1.00	
Satd. Flow (prot)					1681	1699			3539		5083	
Flt Permitted					0.95	0.96			1.00		1.00	
Satd. Flow (perm)					1681	1699			3539		5083	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	1607	147	0	0	864	0	0	1557	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	868	886	0	0	864	0	0	1561	0
Turn Type				Split	NA			NA			NA	
Protected Phases				4	4			2			2	
Permitted Phases												
Actuated Green, G (s)				49.0	49.0			30.0			30.0	
Effective Green, g (s)				49.0	49.0			30.0			30.0	
Actuated g/C Ratio				0.54	0.54			0.33			0.33	
Clearance Time (s)				6.0	6.0			5.0			5.0	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)				915	925			1179			1694	
v/s Ratio Prot				0.52	c0.52			0.24			c0.31	
v/s Ratio Perm												
v/c Ratio				0.95	0.96			0.73			0.92	
Uniform Delay, d1				19.3	19.5			26.5			28.9	
Progression Factor				1.00	1.00			1.00			1.00	
Incremental Delay, d2				18.3	19.9			4.1			9.8	
Delay (s)				37.6	39.4			30.5			38.7	
Level of Service				D	D			C			D	
Approach Delay (s)	0.0				38.5			30.5			38.7	
Approach LOS	A				D			C			D	
Intersection Summary												
HCM 2000 Control Delay				36.9				HCM 2000 Level of Service			D	
HCM 2000 Volume to Capacity ratio				0.94								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			11.0	
Intersection Capacity Utilization				81.4%				ICU Level of Service			D	
Analysis Period (min)				15								
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Volume (veh/h)	195	30	112	70	10	41
Future Volume (Veh/h)	195	30	112	70	10	41
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	212	33	122	76	11	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		245		548	228	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		245		548	228	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		91		98	94	
cM capacity (veh/h)		1321		451	811	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	245	198	56			
Volume Left	0	122	11			
Volume Right	33	0	45			
cSH	1700	1321	701			
Volume to Capacity	0.14	0.09	0.08			
Queue Length 95th (ft)	0	8	6			
Control Delay (s)	0.0	5.2	10.6			
Lane LOS		A	B			
Approach Delay (s)	0.0	5.2	10.6			
Approach LOS		B				
Intersection Summary						
Average Delay		3.3				
Intersection Capacity Utilization		35.3%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	65	146	25	40	142	245	10	160	20	150	250	45
Future Volume (vph)	65	146	25	40	142	245	10	160	20	150	250	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	159	27	43	154	266	11	174	22	163	272	49
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	257	463	207	484								
Volume Left (vph)	71	43	11	163								
Volume Right (vph)	27	266	22	49								
Hadj (s)	0.03	-0.29	-0.02	0.04								
Departure Headway (s)	8.1	7.2	8.3	7.5								
Degree Utilization, x	0.58	0.92	0.48	1.01								
Capacity (veh/h)	420	498	405	477								
Control Delay (s)	21.8	50.0	18.8	71.2								
Approach Delay (s)	21.8	50.0	18.8	71.2								
Approach LOS	C	E	C	F								
Intersection Summary												
Delay					47.6							
Level of Service					E							
Intersection Capacity Utilization				71.7%		ICU Level of Service				C		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	25	1594	1514	179
Future Volume (Veh/h)	0	0	25	1594	1514	179
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	27	1733	1646	195
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.78	0.69	0.69			
vC, conflicting volume	2566	823	1841			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1432	0	1317			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	92			
cM capacity (veh/h)	90	747	359			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	27	866	866	823	823	195
Volume Left	27	0	0	0	0	0
Volume Right	0	0	0	0	0	195
cSH	359	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.51	0.51	0.48	0.48	0.11
Queue Length 95th (ft)	6	0	0	0	0	0
Control Delay (s)	15.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.2			0.0		
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		57.8%		ICU Level of Service		B
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↓	↖	↙	↗	↘
Traffic Volume (veh/h)	195	30	112	70	10	41
Future Volume (Veh/h)	195	30	112	70	10	41
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	212	33	122	76	11	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)			335			
pX, platoon unblocked						
vC, conflicting volume		245		548	228	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		245		548	228	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		91		98	94	
cM capacity (veh/h)		1321		451	811	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	245	198	56			
Volume Left	0	122	11			
Volume Right	33	0	45			
cSH	1700	1321	701			
Volume to Capacity	0.14	0.09	0.08			
Queue Length 95th (ft)	0	8	6			
Control Delay (s)	0.0	5.2	10.6			
Lane LOS		A	B			
Approach Delay (s)	0.0	5.2	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay		3.3				
Intersection Capacity Utilization		35.3%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	20	110	0	10	15	90	5	55	10	100	20	20
Future Volume (vph)	20	110	0	10	15	90	5	55	10	100	20	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	120	0	11	16	98	5	60	11	109	22	22
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	142	125	76	153								
Volume Left (vph)	22	11	5	109								
Volume Right (vph)	0	98	11	22								
Hadj (s)	0.06	-0.42	-0.04	0.09								
Departure Headway (s)	4.7	4.2	4.7	4.7								
Degree Utilization, x	0.18	0.15	0.10	0.20								
Capacity (veh/h)	722	794	716	716								
Control Delay (s)	8.7	7.9	8.2	8.9								
Approach Delay (s)	8.7	7.9	8.2	8.9								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					8.5							
Level of Service					A							
Intersection Capacity Utilization				32.2%		ICU Level of Service				A		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

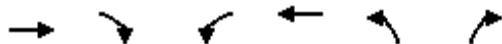


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	25	1594	1514	180
Future Volume (Veh/h)	0	0	25	1594	1514	180
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	27	1733	1646	196
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.79	0.69	0.69			
vC, conflicting volume	2566	823	1842			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1278	0	1319			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	92			
cM capacity (veh/h)	116	747	358			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	27	866	866	823	823	196
Volume Left	27	0	0	0	0	0
Volume Right	0	0	0	0	0	196
cSH	358	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.51	0.51	0.48	0.48	0.12
Queue Length 95th (ft)	6	0	0	0	0	0
Control Delay (s)	15.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.2			0.0		
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		64.3%		ICU Level of Service		C
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Volume (veh/h)	215	35	137	85	10	46
Future Volume (Veh/h)	215	35	137	85	10	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	234	38	149	92	11	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		272		643	253	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		272		643	253	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		88		97	94	
cM capacity (veh/h)		1291		387	786	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	272	241	61			
Volume Left	0	149	11			
Volume Right	38	0	50			
cSH	1700	1291	663			
Volume to Capacity	0.16	0.12	0.09			
Queue Length 95th (ft)	0	10	8			
Control Delay (s)	0.0	5.4	11.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	5.4	11.0			
Approach LOS			B			
Intersection Summary						
Average Delay		3.4				
Intersection Capacity Utilization		38.9%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	75	161	35	55	162	250	15	175	20	155	295	60
Future Volume (vph)	75	161	35	55	162	250	15	175	20	155	295	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	175	38	60	176	272	16	190	22	168	321	65
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	295	508	228	554								
Volume Left (vph)	82	60	16	168								
Volume Right (vph)	38	272	22	65								
Hadj (s)	0.01	-0.26	-0.01	0.02								
Departure Headway (s)	8.4	7.5	8.7	7.8								
Degree Utilization, x	0.69	1.06	0.55	1.20								
Capacity (veh/h)	416	474	393	457								
Control Delay (s)	28.1	86.2	22.1	135.9								
Approach Delay (s)	28.1	86.2	22.1	135.9								
Approach LOS	D	F	C	F								
<b>Intersection Summary</b>												
Delay					83.5							
Level of Service					F							
Intersection Capacity Utilization				78.7%		ICU Level of Service				D		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	26	1670	1586	188
Future Volume (Veh/h)	0	0	26	1670	1586	188
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	28	1815	1724	204
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.78	0.68	0.68			
vC, conflicting volume	2688	862	1928			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1460	0	1418			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	91			
cM capacity (veh/h)	85	735	323			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	28	908	908	862	862	204
Volume Left	28	0	0	0	0	0
Volume Right	0	0	0	0	0	204
cSH	323	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.53	0.53	0.51	0.51	0.12
Queue Length 95th (ft)	7	0	0	0	0	0
Control Delay (s)	17.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.3			0.0		
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		60.1%		ICU Level of Service		B
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Volume (veh/h)	215	35	137	85	10	46
Future Volume (Veh/h)	215	35	137	85	10	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	234	38	149	92	11	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)			335			
pX, platoon unblocked						
vC, conflicting volume		272		643	253	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		272		643	253	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		88		97	94	
cM capacity (veh/h)		1291		387	786	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	272	241	61			
Volume Left	0	149	11			
Volume Right	38	0	50			
cSH	1700	1291	663			
Volume to Capacity	0.16	0.12	0.09			
Queue Length 95th (ft)	0	10	8			
Control Delay (s)	0.0	5.4	11.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	5.4	11.0			
Approach LOS			B			
Intersection Summary						
Average Delay		3.4				
Intersection Capacity Utilization		38.9%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	20	120	0	10	20	90	5	50	15	120	20	15
Future Volume (vph)	20	120	0	10	20	90	5	50	15	120	20	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	130	0	11	22	98	5	54	16	130	22	16
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	152	131	75	168								
Volume Left (vph)	22	11	5	130								
Volume Right (vph)	0	98	16	16								
Hadj (s)	0.06	-0.40	-0.08	0.13								
Departure Headway (s)	4.7	4.3	4.7	4.8								
Degree Utilization, x	0.20	0.16	0.10	0.22								
Capacity (veh/h)	713	778	708	703								
Control Delay (s)	8.9	8.1	8.2	9.2								
Approach Delay (s)	8.9	8.1	8.2	9.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					8.7							
Level of Service					A							
Intersection Capacity Utilization				33.6%		ICU Level of Service				A		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	26	1670	1586	188
Future Volume (Veh/h)	0	0	26	1670	1586	188
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	28	1815	1724	204
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.79	0.68	0.68			
vC, conflicting volume	2688	862	1928			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1301	0	1418			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	91			
cM capacity (veh/h)	110	735	323			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	28	908	908	862	862	204
Volume Left	28	0	0	0	0	0
Volume Right	0	0	0	0	0	204
cSH	323	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.53	0.53	0.51	0.51	0.12
Queue Length 95th (ft)	7	0	0	0	0	0
Control Delay (s)	17.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.3			0.0		
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		66.7%		ICU Level of Service		C
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↓	↖	↙	↗	↘
Traffic Volume (veh/h)	125	31	147	145	40	85
Future Volume (Veh/h)	125	31	147	145	40	85
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	136	34	160	158	43	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		170		631	153	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		170		631	153	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		89		89	90	
cM capacity (veh/h)		1407		394	893	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	170	318	135			
Volume Left	0	160	43			
Volume Right	34	0	92			
cSH	1700	1407	637			
Volume to Capacity	0.10	0.11	0.21			
Queue Length 95th (ft)	0	10	20			
Control Delay (s)	0.0	4.5	12.2			
Lane LOS		A	B			
Approach Delay (s)	0.0	4.5	12.2			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay		4.9				
Intersection Capacity Utilization		41.7%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	90	143	52	30	252	145	12	170	30	245	375	73
Future Volume (vph)	90	143	52	30	252	145	12	170	30	245	375	73
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	155	57	33	274	158	13	185	33	266	408	79
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	310	465	231	753								
Volume Left (vph)	98	33	13	266								
Volume Right (vph)	57	158	33	79								
Hadj (s)	-0.01	-0.16	-0.04	0.04								
Departure Headway (s)	8.4	7.7	8.8	8.1								
Degree Utilization, x	0.73	1.00	0.57	1.69								
Capacity (veh/h)	416	461	390	455								
Control Delay (s)	30.7	69.7	22.8	341.9								
Approach Delay (s)	30.7	69.7	22.8	341.9								
Approach LOS	D	F	C	F								
Intersection Summary												
Delay					173.2							
Level of Service					F							
Intersection Capacity Utilization				101.2%		ICU Level of Service				G		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

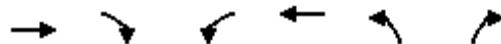


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	33	2306	1747	63
Future Volume (Veh/h)	0	0	33	2306	1747	63
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	36	2507	1899	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.41	0.66	0.66			
vC, conflicting volume	3224	950	1967			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	1441			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	88			
cM capacity (veh/h)	371	718	309			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	36	1254	1254	950	950	68
Volume Left	36	0	0	0	0	0
Volume Right	0	0	0	0	0	68
cSH	309	1700	1700	1700	1700	1700
Volume to Capacity	0.12	0.74	0.74	0.56	0.56	0.04
Queue Length 95th (ft)	10	0	0	0	0	0
Control Delay (s)	18.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.3			0.0		
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		82.3%		ICU Level of Service		E
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↓	↖	↙	↗	↘
Traffic Volume (veh/h)	125	31	147	145	40	85
Future Volume (Veh/h)	125	31	147	145	40	85
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	136	34	160	158	43	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)			335			
pX, platoon unblocked						
vC, conflicting volume		170		631	153	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		170		631	153	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		89		89	90	
cM capacity (veh/h)		1407		394	893	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	170	318	135			
Volume Left	0	160	43			
Volume Right	34	0	92			
cSH	1700	1407	637			
Volume to Capacity	0.10	0.11	0.21			
Queue Length 95th (ft)	0	10	20			
Control Delay (s)	0.0	4.5	12.2			
Lane LOS		A	B			
Approach Delay (s)	0.0	4.5	12.2			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay		4.9				
Intersection Capacity Utilization		41.7%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop				Stop			Stop			Stop
Traffic Volume (vph)	5	67	5	10	111	80	5	20	15	110	50	12
Future Volume (vph)	5	67	5	10	111	80	5	20	15	110	50	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	73	5	11	121	87	5	22	16	120	54	13
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	83	219	43	187								
Volume Left (vph)	5	11	5	120								
Volume Right (vph)	5	87	16	13								
Hadj (s)	0.01	-0.19	-0.17	0.12								
Departure Headway (s)	4.7	4.4	4.7	4.8								
Degree Utilization, x	0.11	0.27	0.06	0.25								
Capacity (veh/h)	704	775	703	706								
Control Delay (s)	8.3	9.0	8.0	9.4								
Approach Delay (s)	8.3	9.0	8.0	9.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					8.9							
Level of Service					A							
Intersection Capacity Utilization				36.5%		ICU Level of Service				A		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020

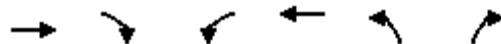


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	33	2306	1747	63
Future Volume (Veh/h)	0	0	33	2306	1747	63
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	36	2507	1899	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.41	0.66	0.66			
vC, conflicting volume	3224	950	1967			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	1441			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	88			
cM capacity (veh/h)	371	718	309			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	36	1254	1254	950	950	68
Volume Left	36	0	0	0	0	0
Volume Right	0	0	0	0	0	68
cSH	309	1700	1700	1700	1700	1700
Volume to Capacity	0.12	0.74	0.74	0.56	0.56	0.04
Queue Length 95th (ft)	10	0	0	0	0	0
Control Delay (s)	18.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	0.3			0.0		
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		82.2%		ICU Level of Service		E
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑→	↓→	↑←	↓←	↑↖	↓↖
Traffic Volume (veh/h)	155	36	152	170	40	90
Future Volume (Veh/h)	155	36	152	170	40	90
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	39	165	185	43	98
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		207		702	188	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		207		702	188	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		88		88	89	
cM capacity (veh/h)		1364		355	855	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	207	350	141			
Volume Left	0	165	43			
Volume Right	39	0	98			
cSH	1700	1364	598			
Volume to Capacity	0.12	0.12	0.24			
Queue Length 95th (ft)	0	10	23			
Control Delay (s)	0.0	4.3	12.9			
Lane LOS		A	B			
Approach Delay (s)	0.0	4.3	12.9			
Approach LOS			B			
Intersection Summary						
Average Delay		4.8				
Intersection Capacity Utilization		45.5%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	110	153	62	45	272	155	17	175	35	255	400	83
Future Volume (vph)	110	153	62	45	272	155	17	175	35	255	400	83
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	120	166	67	49	296	168	18	190	38	277	435	90
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	353	513	246	802								
Volume Left (vph)	120	49	18	277								
Volume Right (vph)	67	168	38	90								
Hadj (s)	-0.01	-0.14	-0.04	0.04								
Departure Headway (s)	8.6	8.1	9.1	8.3								
Degree Utilization, x	0.84	1.16	0.62	1.85								
Capacity (veh/h)	414	446	380	447								
Control Delay (s)	43.0	120.3	26.0	410.2								
Approach Delay (s)	43.0	120.3	26.0	410.2								
Approach LOS	E	F	D	F								
<b>Intersection Summary</b>												
Delay					215.4							
Level of Service					F							
Intersection Capacity Utilization				106.2%		ICU Level of Service				G		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	33	2678	2029	69
Future Volume (Veh/h)	0	0	33	2678	2029	69
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	36	2911	2205	75
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.42	0.65	0.65			
vC, conflicting volume	3732	1102	2280			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	953	73	1889			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	82			
cM capacity (veh/h)	88	632	203			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	36	1456	1456	1102	1102	75
Volume Left	36	0	0	0	0	0
Volume Right	0	0	0	0	0	75
cSH	203	1700	1700	1700	1700	1700
Volume to Capacity	0.18	0.86	0.86	0.65	0.65	0.04
Queue Length 95th (ft)	16	0	0	0	0	0
Control Delay (s)	26.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	D					
Approach Delay (s)	0.3			0.0		
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.2			
Intersection Capacity Utilization		153.2%		ICU Level of Service		H
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Queen City Park Rd & Austin Dr/Home Ave

02/28/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↓	↙	↖	↗	↘
Traffic Volume (veh/h)	155	36	152	170	40	90
Future Volume (Veh/h)	155	36	152	170	40	90
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	39	165	185	43	98
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)			335			
pX, platoon unblocked						
vC, conflicting volume		207		702	188	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		207		702	188	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		88		88	89	
cM capacity (veh/h)		1364		355	855	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	207	350	141			
Volume Left	0	165	43			
Volume Right	39	0	98			
cSH	1700	1364	598			
Volume to Capacity	0.12	0.12	0.24			
Queue Length 95th (ft)	0	10	23			
Control Delay (s)	0.0	4.3	12.9			
Lane LOS		A	B			
Approach Delay (s)	0.0	4.3	12.9			
Approach LOS			B			
Intersection Summary						
Average Delay		4.8				
Intersection Capacity Utilization		45.5%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

3: Pine St & Home Ave

02/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	72	10	10	116	90	5	20	15	125	45	12
Future Volume (vph)	5	72	10	10	116	90	5	20	15	125	45	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	78	11	11	126	98	5	22	16	136	49	13
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	94	235	43	198								
Volume Left (vph)	5	11	5	136								
Volume Right (vph)	11	98	16	13								
Hadj (s)	-0.03	-0.21	-0.17	0.13								
Departure Headway (s)	4.8	4.4	4.8	4.9								
Degree Utilization, x	0.12	0.29	0.06	0.27								
Capacity (veh/h)	699	767	684	693								
Control Delay (s)	8.4	9.2	8.1	9.6								
Approach Delay (s)	8.4	9.2	8.1	9.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					9.1							
Level of Service					A							
Intersection Capacity Utilization				38.2%		ICU Level of Service				A		
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

5: US 7 Shelburne Rd & Queen City Park Rd

02/28/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↑
Traffic Volume (veh/h)	0	0	33	2678	2029	69
Future Volume (Veh/h)	0	0	33	2678	2029	69
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	36	2911	2205	75
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				246	134	
pX, platoon unblocked	0.42	0.65	0.65			
vC, conflicting volume	3732	1102	2280			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	953	73	1889			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	82			
cM capacity (veh/h)	88	632	203			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	36	1456	1456	1102	1102	75
Volume Left	36	0	0	0	0	0
Volume Right	0	0	0	0	0	75
cSH	203	1700	1700	1700	1700	1700
Volume to Capacity	0.18	0.86	0.86	0.65	0.65	0.04
Queue Length 95th (ft)	16	0	0	0	0	0
Control Delay (s)	26.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	D					
Approach Delay (s)	0.3			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization		93.0%		ICU Level of Service		F
Analysis Period (min)		15				

SIGNALIZED INTERSECTION CAPACITY ANALYSES SUMMARY BY LANE GROUP

Intersection	Movement	Champlain Parkway No Build						Champlain Parkway Build						
		Burton No Build			Burton Build			Burton No Build			Burton Build			
		v/c*	Delay*	LOS **	v/c*	Delay*	LOS **	v/c*	Delay*	LOS **	v/c*	Delay*	LOS **	
2008														
<b>US 7 / Home Ave</b>														
AM	Home Ave	EB Left / Thru	0.41	38.7	D	0.41	38.7	D	0.44	39.7	D	0.44	39.7	D
		EB Right	0.19	36.6	D	0.19	36.6	D	0.14	36.8	D	0.14	36.8	D
	Farrell St	WB Left	0.11	36	D	0.11	36	D	0.11	36.7	D	0.11	36.7	D
		WB Thru / Right	0.03	35.5	D	0.03	35.5	D	0.03	36.1	D	0.03	36.1	D
	US 7	NB Left	0.63	15.1	B	0.63	15.2	B	0.11	3.9	A	0.11	3.9	A
		NB Thru / Right	0.59	7	A	0.59	7	A	0.45	5.4	A	0.45	5.4	A
	US 7	SB Left	0.38	51.9	D	0.38	51.9	D	0.38	51.9	D	0.38	51.9	D
		SB Thru / Right	0.54	16.4	B	0.54	16.4	B	0.38	11.5	B	0.38	11.5	B
PM	Home Ave	EB Left / Thru	0.38	37.2	D	0.39	37.2	D	0.42	39.7	D	0.42	39.7	D
		EB Right	0.24	36.1	D	0.25	35.8	D	0.10	36.7	D	0.10	36.7	D
	Farrell St	WB Left	0.20	35.9	D	0.19	35.5	D	0.24	37.9	D	0.24	37.9	D
		WB Thru / Right	0.13	35.2	D	0.13	34.9	C	0.15	37.0	D	0.15	37.0	D
	US 7	NB Left	0.74	27.1	C	0.90	43.3	D	0.29	8.1	A	0.30	8.4	A
		NB Thru / Right	0.66	10.3	B	0.66	10.5	B	0.58	8.1	A	0.58	8.1	A
	US 7	SB Left	0.45	43.8	D	0.45	43.8	D	0.41	43.5	D	0.41	43.5	D
		SB Thru / Right	0.78	21.2	C	0.80	22.3	C	0.53	14.8	B	0.54	14.8	B
<b>US 7 / Queen City Park (south)</b>														
AM	Queen City Park Rd	EB Left	0.64	63.1	E	0.65	63.3	E	0.88	86.3	F	0.88	86.3	F
		EB Right	0.01	53.5	D	0.01	53.5	D	0.14	50.2	D	0.14	50.2	D
	US 7	NB Thru	0.57	5.0	A	0.57	5.0	A	0.6	7.1	A	0.60	7.1	A
	US 7	SB Thru	0.57	5.0	A	0.57	5.0	A	0.6	7	A	0.60	7	A
PM	Queen City Park Rd	EB Left	1.14	156.1	F	1.23	189.3	F	1.08	139	F	1.13	156.2	F
		EB Right	0.01	48.3	D	0.01	48.3	D	0.22	49.9	D	0.29	50.5	D
	US 7	NB Thru	0.82	12.3	B	0.82	12.3	B	0.82	12.3	B	0.82	12.3	B
	US 7	SB Thru	0.70	9.0	A	0.70	9.0	A	0.7	9	A	0.70	9.0	A
<b>Champlain Parkway / Home Ave</b>														
AM	Home Ave	EB							0.74	58.8	E	0.74	58.8	E
		EB Right							0.1	41.7	D	0.10	41.8	D
	Home Ave	WB							0.45	46.1	D	0.45	46.2	D
	Champlain Parkway	NB Left							0.75	60.3	E	0.76	61.4	E
		NB							0.49	10.1	B	0.49	10.1	B
	Champlain Parkway	SB Left							0.28	60	E	0.28	60.1	E
		SB							0.69	20	B	0.69	19.9	B
	Home Ave	EB							0.53	58.0	E	0.62	62.6	E
PM		EB Right							0.07	51.6	D	0.08	52.1	D
	Home Ave	WB							0.90	99.5	F	1.02	133.8	F
	Champlain Parkway	NB Left							0.88	116.4	F	1.15	182.9	F
		NB							0.40	9.2	A	0.40	9.6	A
	Champlain Parkway	SB Left							0.33	79.5	E	0.33	79.9	E
<b>I-189 Ramp C / US 7</b>														
AM	I-189 Ramp C	WB Left	0.88	28.6	C	0.88	28.4	C	0.85	26.9	C	0.85	27.1	C
		WB	0.86	27.4	C	0.86	27.3	C	0.85	26.2	C	0.85	26.2	C
	US 7	NB	0.77	30.6	C	0.78	30.8	C	0.61	25.7	C	0.61	25.7	C
	US 7	SB	0.72	27.8	C	0.73	28.0	C	0.55	24.1	C	0.55	24.1	C
PM	I-189 Ramp C	WB Left	0.91	31.6	C	0.92	32.7	C	0.89	29.5	C	0.90	31.0	C
		WB	0.90	30.2	C	0.90	30.8	C	0.88	28.9	C	0.89	29.8	C
	US 7	NB	0.79	31.8	C	0.80	32.3	C	0.71	28.9	C	0.72	29.2	C
	US 7	SB	1.21	130.8	F	1.23	138.9	F	0.85	32.4	C	0.85	32.8	C

SIGNALIZED INTERSECTION CAPACITY ANALYSES SUMMARY BY LANE GROUP

Intersection	Movement	Champlain Parkway No Build						Champlain Parkway Build						
		Burton No Build			Burton Build			Burton No Build			Burton Build			
		v/c*	Delay*	LOS **	v/c*	Delay*	LOS **	v/c*	Delay*	LOS **	v/c*	Delay*	LOS **	
2028														
<b>US 7 / Home Ave</b>														
AM	Home Ave	EB Left / Thru	0.40	38.4	D	0.40	38.4	D	0.43	39.6	D	0.43	39.6	D
		EB Right	0.21	36.6	D	0.21	36.6	D	0.15	36.8	D	0.15	36.8	D
	Farrell St	WB Left	0.10	35.8	D	0.10	35.8	D	0.11	36.6	D	0.11	36.6	D
		WB Thru / Right	0.03	35.3	D	0.03	35.3	D	0.03	36	D	0.03	36	D
	US 7	NB Left	0.74	22.4	C	0.75	22.5	C	0.13	4.7	A	0.13	4.7	A
		NB Thru / Right	0.59	7.0	A	0.59	7.0	A	0.45	5.4	A	0.45	5.4	A
	US 7	SB Left	0.38	51.9	D	0.38	51.9	D	0.38	51.9	D	0.38	51.9	D
		SB Thru / Right	0.67	18.7	B	0.67	18.7	B	0.43	12.2	B	0.43	12.2	B
PM	Home Ave	EB Left / Thru	0.37	37.1	D	0.39	37	D	0.42	39.6	D	0.42	39.6	D
		EB Right	0.26	36	D	0.26	35.8	D	0.11	36.8	D	0.11	36.8	D
	Farrell St	WB Left	0.19	35.6	D	0.19	35.3	D	0.24	37.9	D	0.24	37.9	D
		WB Thru / Right	0.12	35	C	0.13	34.7	C	0.14	37.0	D	0.14	37.0	D
	US 7	NB Left	0.86	38.4	D	1.01	70.4	E	0.32	9.1	A	0.34	9.4	A
		NB Thru / Right	0.69	11	B	0.69	11.2	B	0.58	8.2	A	0.58	8.2	A
	US 7	SB Left	0.45	43.8	D	0.45	43.8	D	0.41	43.5	D	0.41	43.5	D
		SB Thru / Right	0.81	22.7	C	0.83	23.8	C	0.55	15.0	B	0.55	15.0	B
<b>US 7 / Queen City Park (south)</b>														
AM	Queen City Park Rd	EB Left	0.65	63.4	E	0.66	63.3	E	0.92	93	D	0.92	93	D
		EB Right	0.01	53.2	D	0.01	53.1	D	0.15	50	F	0.15	50	F
	US 7	NB Thru	0.60	5.5	A	0.60	5.5	A	0.63	7.6	A	0.63	7.6	A
	US 7	SB Thru	0.60	5.4	A	0.60	5.5	A	0.63	7.5	A	0.63	7.5	A
PM	Queen City Park Rd	EB Left	1.32	226.7	F	1.41	264	F	1.19	177.7	F	1.25	197.3	F
		EB Right	0.01	48.3	D	0.01	48.3	D	0.33	50.9	D	0.40	51.5	D
	US 7	NB Thru	0.95	22.2	C	0.95	22.2	C	0.95	22.2	C	0.95	22.2	C
	US 7	SB Thru	0.81	11.9	B	0.81	11.9	B	0.81	11.9	B	0.81	11.9	B
<b>Champlain Parkway / Home Ave</b>														
AM	Home Ave	EB							0.81	66.9	E	0.81	66.9	E
		EB Right							0.16	42.2	D	0.16	42.3	D
	Home Ave	WB							0.60	53.8	D	0.61	54.2	D
	Champlain Parkway	NB Left							0.81	64.6	E	0.81	64.6	E
		NB							0.51	10.5	B	0.50	10.5	B
	Champlain Parkway	SB Left							0.28	60.4	E	0.28	60.5	E
		SB							0.75	23.4	C	0.75	23.5	C
	Home Ave	EB							0.62	61.5	E	0.70	67.8	E
PM		EB Right							0.09	51.3	D	0.13	51.7	D
	Home Ave	WB							0.97	119.3	F	1.07	150.4	F
	Champlain Parkway	NB Left							0.98	141.4	F	1.10	160.4	F
		NB							0.41	10.1	B	0.41	10.1	B
	Champlain Parkway	SB Left							0.33	79.9	E	0.33	79.9	E
		SB							0.95	38.9	D	1.03	61.6	E
<b>I-189 Ramp C / US 7</b>														
AM	I-189 Ramp C	WB Left	0.85	26.5	C	0.84	26.4	C	0.84	26.3	C	0.84	26.4	C
		WB	0.84	25.8	C	0.84	25.7	C	0.84	25.7	C	0.84	25.7	C
	US 7	NB	0.81	31.6	C	0.82	31.7	C	0.66	26.5	C	0.66	26.5	C
	US 7	SB	0.83	30.4	C	0.83	30.6	C	0.61	24.9	C	0.61	24.9	C
AM	I-189 Ramp C	WB Left	0.95	38.6	D	0.97	41.6	D	0.94	35.3	D	0.95	37.6	D
		WB	0.97	41.3	D	0.98	44.3	D	0.95	37.5	D	0.96	39.4	D
	US 7	NB	0.82	34	C	0.82	34	C	0.73	30.4	C	0.73	30.5	C
	US 7	SB	1.31	174.6	F	1.32	177.5	F	0.92	38.1	D	0.92	38.7	D



---

## Safety Assessment Data

Five Year Pgm/Clas s 1 Town	Highway Rank	Route	System	Town	Mileage	AADT	Years	Crashes	Fatalities	Injuries	Crashes	Severity			Description		
												PDO	Critical	Actual	Actual/Critical	(\$/Crash es/1.)	
High Crash Segments																	
#	114	US-7	Principal Arterial (u	South Burlington	1.412 - 1.712	32257	5	224	0	25	209	6	12.684	2.114	20421	US 7 from Queen City Park Road to Laurel Hill drive	
#	334	US-7	Principal Arterial (u	Burlington	0.174 - 0.474	26025	5	128	0	29	105	6.144	8.983	1.462	29320	US 7 from I-189 Ramp C to north of Scarff Ave	
#	247	I-189	Interstate- Urban (i	Burlington- South Burlington	0.000 - 0.240	40400	5	43	0	14	33	1.194	1.944	1.628	37486	I-189 from the merge of Ramp E through the merge of Ramp A	
High Crash Intersections																	
#	76	US-7- <0189>- SWIFT ST- SOUTH BURLINGTON	Principal Arterial (u	South Burlington/Burlington	1.720 - 0.010	38650	5	60	0	1	59	0.731	0.851	1.163	12587	US 7 I-189 Ramp A and Swift Street	

AOT Route	Crash Type	Collision Direction	Weather	Impairment	Involving	Road Condition	Surface Condition
HOME AVE	Injury	Single Vehicle Crash	Cloudy	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Ice
INDUSTRIAL PKWY	Property Damage Only	Head On	Clear	None	None	None	Dry
INDUSTRIAL PKWY	Property Damage Only	Rear End	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	Rear End	Clear	None	Heavy Truck	Road Surface Condition(wet, icy, snow, slush, etc)	Ice
HOME AVE	Property Damage Only	Rear End	Cloudy	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
BATCHELDER ST	Property Damage Only	Other - Explain in Narrative	Clear	None	None	Unknown	Unknown
HOME AVE	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
HOME AVE	Injury	Rear End	Cloudy	None	Bicycle	None	Dry
BATCHELDER ST	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
PINE ST	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Snow
HOME AVE	Property Damage Only	Rear End	Clear	None	None	None	Dry
PINE ST	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	Same Direction Sideswipe	Cloudy	None	None	None	Wet
HOME AVE	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Cloudy	None	None	None	Wet
PINE ST	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
PINE ST	Property Damage Only	Right Turn and Thru, Same Direction Sideswipe/Angle Crash ^--	Cloudy	None	None	None	Wet
PINE ST	Property Damage Only	Rear End	Clear	None	None	None	Dry
PINE ST	Property Damage Only	Rear End	Clear	None	None	None	Dry
PINE ST	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Cloudy	None	None	None	Dry
PINE ST	Property Damage Only	Rear End	Clear	None	None	None	Dry
PINE ST	Property Damage Only	Head On	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
PINE ST	Property Damage Only	Rear End	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
PINE ST	Property Damage Only	Same Direction Sideswipe	None	None	None	None	Dry
PINE ST	Property Damage Only	Rear End	Cloudy	None	Heavy Truck	None	Dry
PINE ST	Injury	Rear End	Clear	None	None	None	Dry
PINE ST	Injury	Rear End	Clear	None	None	None	Dry
PINE ST	Property Damage Only	None	None	None	None	None	Dry
HOME AVE	Property Damage Only	Left Turn and Thru, Broadside v<--	Clear	Alcohol	None	None	Dry
HOME AVE	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	Rear End	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
HOME AVE	Property Damage Only	Right Turn and Thru, Same Direction Sideswipe/Angle Crash ^--	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
QUEEN CITY PARK RD	Property Damage Only	None	None	None	None	None	Dry
QUEEN CITY PARK RD	Property Damage Only	Single Vehicle Crash	Clear	Alcohol	None	None	Dry
INDUSTRIAL PKWY	Property Damage Only	Other - Explain in Narrative	Wind	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Ice
INDUSTRIAL PKWY	Injury	Other - Explain in Narrative	Cloudy	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Ice
QUEEN CITY PARK RD	Injury	Head On	Clear	None	None	None	Dry
PINE ST	Property Damage Only	Rear End	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
PINE ST	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
PINE ST	Property Damage Only	Rear End	Clear	None	None	None	Dry
PINE ST	Property Damage Only	Head On	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Ice
PINE ST	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
QUEEN CITY PARK RD	Property Damage Only	Single Vehicle Crash	Clear	None	None	None	Dry
PINE ST	Property Damage Only	None	None	None	None	None	Dry
PINE ST	Property Damage Only	Head On	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Snow
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	Right Turn and Thru, Angle Broadside -->^--	Rain	None	None	None	Wet

AOT Route	Crash Type	Collision Direction	Weather	Impairment	Involving	Road Condition	Surface Condition
US-7	Property Damage Only	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	Cloudy	None	None	None	Wet
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	Heavy Truck	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Cloudy	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Rain	None	None	None	Wet
US-7	Injury	Left Turn and Thru, Broadside v<--	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	None	None	Heavy Truck	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Wet
US-7	Property Damage Only	Rear End	None	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Dry
US-7	Property Damage Only	Rear End	None	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
I-189	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Snow
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Right Turn and Thru, Same Direction Sideswipe/Angle Crash ^-->	None	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	Heavy Truck	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Injury	Rear End	Clear	None	None	Unknown	Dry
I-189	Injury	Rear End	Cloudy	None	None	None	Dry
I-189	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Injury	Rear End	Clear	None	None	None	Wet
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	Heavy Truck	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Injury	Rear End	Rain	None	None	None	Wet
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Wet
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	Heavy Truck	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Wet
SHELBOURNE ST	Property Damage Only	Single Vehicle Crash	Cloudy	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Same Direction Sideswipe	Cloudy	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Rear-to-rear	Clear	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Left Turn and Thru, Head On ^v--	Clear	None	None	None	Dry

AOT Route	Crash Type	Collision Direction	Weather	Impairment	Involving	Road Condition	Surface Condition
SHELBOURNE ST	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Opp Direction Sideswipe	Clear	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Injury	No Turns, Thru moves only, Broadside ^<	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Wet
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Ice
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Rain	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Wet
I-189	Injury	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
I-189							
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Injury	Rear End	None	None	None	None	Dry
I-189	Injury	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
I-189							
I-189	Injury	Single Vehicle Crash	Rain	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	
I-189							
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Injury	Rear End	Rain	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Wet
I-189	Injury	Rear End	Cloudy	None	None	None	Dry
I-189	Injury	Single Vehicle Crash	Clear	None	None	None	Dry
I-189	Property Damage Only	Single Vehicle Crash	None	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Ice
I-189	Property Damage Only	Single Vehicle Crash	Cloudy	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Wet
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Single Vehicle Crash	Clear	None	None	None	Dry
I-189	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Ice
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
I-189	Injury	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
I-189	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
I-189	Injury	Rear End	Clear	None	None	None	Dry
I-189	Property Damage Only	Single Vehicle Crash	Cloudy	None	Heavy Truck	None	Wet
I-189	Property Damage Only	Rear End	Cloudy	None	None	Unknown	Dry
I-189	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
I-189	Injury	Same Direction Sideswipe	Clear	None	None	None	Dry
I-189	Property Damage Only	Rear End	Cloudy	None	Heavy Truck	None	Wet
I-189 EXIT 1 RAMP							
I-189	Property Damage Only	Single Vehicle Crash	Cloudy	Alcohol	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	



AOT Route	Crash Type	Collision Direction	Weather	Impairment	Involving	Road Condition	Surface Condition
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End		None	None	None	Dry
US-7	Property Damage Only	Rear End	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
US-7	Injury	Same Direction Sideswipe	Clear	None	Motorcycle	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Broadside v<--	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
US-7	Property Damage Only	Rear End	Clear	None	None	None	Wet
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe		None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Rain	None	None	None	Wet
US-7	Property Damage Only	Property Damage Only	Unknown	None	None		
US-7	Property Damage Only	Rear End	Rain	None	None	None	Wet
US-7	Property Damage Only	Left Turn and Thru, Broadside v<--		None	None	Other - Explain in Narrative	Dry
US-7	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Clear	None	None	None	Dry
US-7	Injury	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Property Damage Only		None	None		
US-7	Property Damage Only	Other - Explain in Narrative	Clear	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
US-7	Property Damage Only	Left Turns, Opposite Directions, Head On/Angle Crash --^v--	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	Other - Explain in Narrative	Wet
US-7	Property Damage Only	Same Direction Sideswipe	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	Heavy Truck	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	Single Vehicle Crash	Rain	None	None	None	Wet
US-7	Property Damage Only	Rear End	Clear	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Dry
US-7	Injury	Rear End	Rain	None	None	None	Wet
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	Motorcycle	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	Rain	None	None	None	Wet
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Rain	None	None	None	Wet
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End		None	None		
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Rain	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Wet
US-7	Property Damage Only	Rear End	Rain	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Wet
US-7	Property Damage Only	Rear End	Rain	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Cloudy	None	None		
US-7	Property Damage Only	Rear End	Unknown	None	None		
US-7	Property Damage Only	Rear-to-rear	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow

AOT Route	Crash Type	Collision Direction	Weather	Impairment	Involving	Road Condition	Surface Condition
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None		
US-7	Property Damage Only		Unknown	None	None		
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Broadside v<--	Clear	None	None	None	Dry
US-7	Injury	Left Turn and Thru, Broadside v<--	Clear	None	None	None	Dry
US-7	Injury	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	Motorcycle	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	Heavy Truck	None	Dry
US-7	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
US-7	Property Damage Only			None	None		
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only			None	None		
US-7	Property Damage Only	Same Direction Sideswipe	Rain	None	None	None	Wet
US-7	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
US-7	Property Damage Only	Single Vehicle Crash	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Unknown	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Cloudy	None	None	None	Wet
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	Heavy Truck	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only			None	None		
I-189	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Freezing Precipitation	None	None	None	Wet
US-7	Property Damage Only	Same Direction Sideswipe	Rain	None	None	None	Wet
US-7	Property Damage Only	Rear End	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Wet
US-7	Property Damage Only	Same Direction Sideswipe	Rain	None	None	Unknown	Wet
US-7	Property Damage Only	Rear End	Cloudy	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Ice
US-7	Injury	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Injury	No Turns, Thru moves only, Broadside ^<	Freezing Precipitation	None	None	None	Wet
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Cloudy	None	None	None	Wet
US-7	Property Damage Only	Rear End	Rain	None	None	None	Wet
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Single Vehicle Crash		None	None	None	Not Reported
US-7	Property Damage Only		Clear	None	None	Unknown	
US-7	Property Damage Only	Same Direction Sideswipe		None	Heavy Truck	None	Dry
US-7	Property Damage Only			None	None		
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry

AOT Route	Crash Type	Collision Direction	Weather	Impairment	Involving	Road Condition	Surface Condition
US-7	Injury	No Turns, Thru moves only, Broadside ^<	Rain	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Wet
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	Cloudy	None	None	None	Unknown
SHELBOURNE ST	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Other - Explain in Narrative	Rain	None	None	None	Wet
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Wet
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Other - Explain in Narrative	Cloudy	None	None	Unknown	Dry
SHELBOURNE ST	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
SHELBOURNE ST	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Property Damage Only	None	None	None	None	
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Ice
US-7	Property Damage Only	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Left Turns, Same Direction, Rear End v--v-	Cloudy	None	Heavy Truck	None	Dry
US-7	Property Damage Only	Property Damage Only	None	None	None	None	
US-7	Property Damage Only	Rear End	Clear	None	Heavy Truck	Road Surface Condition(wet, icy, snow, slush, etc)	Dry
US-7	Injury	Left Turn and Thru, Broadside v<--	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Property Damage Only	None	None	None	None	
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Cloudy	None	None	None	Dry
US-7	Injury	Left Turn and Thru, Angle Broadside -->v--	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Freezing Precipitation	None	None	Road Surface Condition(wet, icy, snow, slush, etc)	Snow
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Injury	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Injury	Rear End	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Injury	No Turns, Thru moves only, Broadside ^<	Clear	None	Bicycle	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry

AOT Route	Crash Type	Collision Direction	Weather	Impairment	Involving	Road Condition	Surface Condition
US-7	Injury	Other - Explain in Narrative	Rain	None	Pedestrian	None	Wet
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Cloudy	None	None	None	Wet
US-7	Property Damage Only	Right Turn and Thru, Same Direction Sideswipe/Angle Crash ^--	Clear	None	None	None	Dry
US-7	Injury	Other - Explain in Narrative	Cloudy	None	Pedestrian	None	Dry
US-7	Property Damage Only	Rear End	Rain	None	None	None	Wet
US-7	Property Damage Only	Same Direction Sideswipe	Rain	None	None	None	Wet
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Head On	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Rain	None	Heavy Truck	None	Wet
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Same Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	Opp Direction Sideswipe	Clear	None	None	None	Dry
US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	Heavy Truck	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Rain	None	None	Unknown	Wet
US-7	Property Damage Only	Rear End	Cloudy	None	None	None	Dry
US-7	Injury	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	Dry
US-7	Property Damage Only			None	None		
US-7	Property Damage Only			None	None		
US-7	Property Damage Only			None	None		
US-7	Property Damage Only			None	None		
US-7	Fatal	No Turns, Thru moves only, Broadside ^<	Clear	Alcohol	None	None	Dry
US-7	Property Damage Only			None	None		
US-7	Property Damage Only			None	None		
US-7	Property Damage Only			None	None		
US-7	Property Damage Only			None	None		
US-7	Property Damage Only			None	None		
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Clear	None	None	None	Dry
US-7	Injury	Rear End	Clear	None	None	None	Dry
US-7	Property Damage Only			None	None		
SHELBYNE ST	Property Damage Only	Opp Direction Sideswipe	Clear	Alcohol	None	None	Dry
HOME AVE	Injury	Right Turn and Thru, Broadside ^<--	Clear	None	Pedestrian	None	Dry
SHELBYNE ST	Property Damage Only	Head On	Clear	None	None	None	Dry
SHELBYNE ST	Property Damage Only	Other - Explain in Narrative	Unknown	None	None	Unknown	Unknown
SHELBYNE ST	Property Damage Only	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	Left and Right Turns, Simultaneous Turn Crash --vv--	Cloudy	Alcohol	None	None	Wet
SHELBYNE ST	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
SHELBYNE ST	Property Damage Only	Rear-to-rear	Clear	None	None	None	Dry
HOME AVE	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	None	None	None	
SHELBYNE ST	Property Damage Only	Other - Explain in Narrative	Clear	None	None	None	Dry
HOME AVE	Property Damage Only			None	None		
HOME AVE	Injury	Same Direction Sideswipe	Cloudy	None	Pedestrian	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry
US-7	Injury	Left Turn and Thru, Angle Broadside -->v--	Cloudy	None	None	None	Dry
US-7	Property Damage Only	Rear End	Clear	None	None	None	Dry



---

## **Single Lane Bridge**

### Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	209	208	196	204	181	199
Vehs Exited	209	208	194	201	177	197
Starting Vehs	1	1	0	0	0	0
Ending Vehs	1	1	2	3	4	1
Travel Distance (mi)	57	56	53	55	49	54
Travel Time (hr)	2.6	2.5	2.4	2.5	2.2	2.5
Total Delay (hr)	0.5	0.4	0.4	0.5	0.4	0.4
Total Stops	180	173	169	175	143	168
Fuel Used (gal)	2.3	2.2	2.1	2.2	1.9	2.2

### Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3

No data recorded this interval.

### Interval #1 Information Recording

Start Time	7:00					
End Time	8:00					
Total Time (min)	60					
Run Number	1	2	3	4	5	Avg
Vehs Entered	209	208	196	204	181	199
Vehs Exited	209	208	194	201	177	197
Starting Vehs	1	1	0	0	0	0
Ending Vehs	1	1	2	3	4	1
Travel Distance (mi)	57	56	53	55	49	54
Travel Time (hr)	2.6	2.5	2.4	2.5	2.2	2.5
Total Delay (hr)	0.5	0.4	0.4	0.5	0.4	0.4
Total Stops	180	173	169	175	143	168
Fuel Used (gal)	2.3	2.2	2.1	2.2	1.9	2.2

---

### 1: EB Queen City Park Rd Performance by approach

---

Approach	EB	WB	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.0	0.1
Total Delay (hr)	0.2	0.0	0.2
Total Del/Veh (s)	5.6	1.6	4.4

---

### 2: WB Queen City Park Road Performance by approach

---

Approach	EB	WB	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.1	0.0
Total Delay (hr)	0.1	0.1	0.2
Total Del/Veh (s)	1.6	6.6	3.1

---

### Total Network Performance

---

Denied Delay (hr)	0.0
Denied Del/Veh (s)	0.2
Total Delay (hr)	0.4
Total Del/Veh (s)	7.8

---

Intersection: 1: EB Queen City Park Rd

---

Movement	EB
Directions Served	T
Maximum Queue (ft)	77
Average Queue (ft)	37
95th Queue (ft)	61
Link Distance (ft)	623
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

---

Intersection: 2: WB Queen City Park Road

---

Movement	WB
Directions Served	T
Maximum Queue (ft)	62
Average Queue (ft)	26
95th Queue (ft)	54
Link Distance (ft)	652
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

---

Network Summary

---

Network wide Queuing Penalty: 0

---

Intersection: 1: EB Queen City Park Rd

Phase	1	2
Movement(s) Served	EBT	WBT
Maximum Green (s)	3.0	3.0
Minimum Green (s)	1.0	1.0
Recall	None	None
Avg. Green (s)	2.1	2.2
g/C Ratio	-0.01	-0.01
Cycles Skipped (%)	39	73
Cycles @ Minimum (%)	24	10
Cycles Maxed Out (%)	14	7
Cycles with Peds (%)	0	0

Controller Summary

Average Cycle Length (s): NA

Number of Complete Cycles : 0

### Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	283	313	287	261	265	282
Vehs Exited	281	310	286	260	266	281
Starting Vehs	1	1	2	2	4	2
Ending Vehs	3	4	3	3	3	3
Travel Distance (mi)	76	85	78	71	72	76
Travel Time (hr)	3.6	4.0	3.6	3.3	3.3	3.6
Total Delay (hr)	0.7	0.8	0.7	0.7	0.6	0.7
Total Stops	245	271	252	232	224	244
Fuel Used (gal)	3.1	3.4	3.1	2.9	2.9	3.1

### Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
No data recorded this interval.	

### Interval #1 Information Recording

Start Time	7:00					
End Time	8:00					
Total Time (min)	60					
Run Number	1	2	3	4	5	Avg
Vehs Entered	283	313	287	261	265	282
Vehs Exited	281	310	286	260	266	281
Starting Vehs	1	1	2	2	4	2
Ending Vehs	3	4	3	3	3	3
Travel Distance (mi)	76	85	78	71	72	76
Travel Time (hr)	3.6	4.0	3.6	3.3	3.3	3.6
Total Delay (hr)	0.7	0.8	0.7	0.7	0.6	0.7
Total Stops	245	271	252	232	224	244
Fuel Used (gal)	3.1	3.4	3.1	2.9	2.9	3.1

---

### 1: EB Queen City Park Rd Performance by approach

---

Approach	EB	WB	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.0	0.1
Total Delay (hr)	0.3	0.1	0.4
Total Del/Veh (s)	6.6	1.7	4.5

---

### 2: WB Queen City Park Road Performance by approach

---

Approach	EB	WB	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.2	0.1
Total Delay (hr)	0.1	0.2	0.3
Total Del/Veh (s)	1.7	7.6	4.1

---

### Total Network Performance

---

Denied Delay (hr)	0.0
Denied Del/Veh (s)	0.2
Total Delay (hr)	0.7
Total Del/Veh (s)	8.8

---

Intersection: 1: EB Queen City Park Rd

---

Movement	EB
Directions Served	T
Maximum Queue (ft)	90
Average Queue (ft)	44
95th Queue (ft)	72
Link Distance (ft)	623
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

---

Intersection: 2: WB Queen City Park Road

---

Movement	WB
Directions Served	T
Maximum Queue (ft)	91
Average Queue (ft)	38
95th Queue (ft)	67
Link Distance (ft)	652
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

---

Network Summary

---

Network wide Queuing Penalty: 0

---

Intersection: 1: EB Queen City Park Rd

Phase	1	2
Movement(s) Served	EBT	WBT
Maximum Green (s)	3.0	3.0
Minimum Green (s)	1.0	1.0
Recall	None	None
Avg. Green (s)	2.3	2.3
g/C Ratio	-0.01	-0.01
Cycles Skipped (%)	47	62
Cycles @ Minimum (%)	17	12
Cycles Maxed Out (%)	14	10
Cycles with Peds (%)	0	0

Controller Summary

Average Cycle Length (s): NA

Number of Complete Cycles : 0

### Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	308	325	325	269	281	301
Vehs Exited	310	324	327	271	279	303
Starting Vehs	4	3	6	3	1	4
Ending Vehs	2	4	4	1	3	3
Travel Distance (mi)	84	88	88	73	76	82
Travel Time (hr)	3.9	4.2	4.0	3.4	3.5	3.8
Total Delay (hr)	0.7	0.8	0.8	0.6	0.6	0.7
Total Stops	263	283	265	228	240	255
Fuel Used (gal)	3.4	3.6	3.5	3.0	3.1	3.3

### Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3

No data recorded this interval.

### Interval #1 Information Recording

Start Time	7:00					
End Time	8:00					
Total Time (min)	60					
Run Number	1	2	3	4	5	Avg
Vehs Entered	308	325	325	269	281	301
Vehs Exited	310	324	327	271	279	303
Starting Vehs	4	3	6	3	1	4
Ending Vehs	2	4	4	1	3	3
Travel Distance (mi)	84	88	88	73	76	82
Travel Time (hr)	3.9	4.2	4.0	3.4	3.5	3.8
Total Delay (hr)	0.7	0.8	0.8	0.6	0.6	0.7
Total Stops	263	283	265	228	240	255
Fuel Used (gal)	3.4	3.6	3.5	3.0	3.1	3.3

---

### 1: EB Queen City Park Rd Performance by approach

---

Approach	EB	WB	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.3	0.0	0.3
Total Delay (hr)	0.5	0.0	0.5
Total Del/Veh (s)	6.2	1.7	5.9

---

### 2: WB Queen City Park Road Performance by approach

---

Approach	EB	WB	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.1	0.0
Total Delay (hr)	0.1	0.0	0.2
Total Del/Veh (s)	1.6	7.1	2.0

---

### Total Network Performance

---

Denied Delay (hr)	0.0
Denied Del/Veh (s)	0.3
Total Delay (hr)	0.7
Total Del/Veh (s)	8.1

---

Intersection: 1: EB Queen City Park Rd

---

Movement	EB
Directions Served	T
Maximum Queue (ft)	138
Average Queue (ft)	57
95th Queue (ft)	94
Link Distance (ft)	623
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

---

Intersection: 2: WB Queen City Park Road

---

Movement	WB
Directions Served	T
Maximum Queue (ft)	36
Average Queue (ft)	13
95th Queue (ft)	37
Link Distance (ft)	652
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

---

Network Summary

---

Network wide Queuing Penalty: 0

---

Intersection: 1: EB Queen City Park Rd

Phase	1	2
Movement(s) Served	EBT	WBT
Maximum Green (s)	3.0	3.0
Minimum Green (s)	1.0	1.0
Recall	None	None
Avg. Green (s)	2.3	2.4
g/C Ratio	-0.01	-0.01
Cycles Skipped (%)	24	94
Cycles @ Minimum (%)	24	2
Cycles Maxed Out (%)	21	1
Cycles with Peds (%)	0	0

Controller Summary

Average Cycle Length (s): NA

Number of Complete Cycles : 0